A REVISON OF THE GENUS PROSOPIS IN NORTH AMERICA.

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(Plates II–IX.)

The genus *Prosopis* is represented in North America by a group of small, very nearly related bees, showing thruout a remarkable homogeneity in form and structure, but at the same time an almost infinite variability in many sculptural and color characters. The genus is widely distributed over the entire United States and far into Canada, being perhaps best represented in the high mountainous States of the Middle West. Representatives may be found in almost any locality that is not entirely devoid of vegetation, but the individuals are seldom abundant. Apparently each species appears thruout its range during a given restricted season, corresponding to the time of blossoming of certain flowers, but too scant investigations have been made so far, to give any definite data. Ordinarily specimens can be found during the summer months from June to September, in most States.

The present paper is based very largely upon a collection of about six thousand specimens accumulated for this purpose. This collection contains series from practically all the localities in which collecting in this genus has been done. The accompanying map shows the approximate range covered by the material. So far as I know it contains a very large proportion, probably three-fourths, of the specimens available in American collections. Most of it is from the collection of Professor C. F. Baker, of Pomona College; for the remainder I am indebted to Messrs. Cockerell, Swenk, Nason, Lovell, and Viereck, who have either loaned or exchanged specimens from their collections, and hearty thanks are due these gentlemen, since without their aid this paper would have been impossible. The C. F. Baker collection contains most of the Baker material from the U. S. National Museum, as well as many cotypes of species originally described from

this and other collections. On the whole this is the largest amount of material in this genus ever collected for study in America.

An examination of these large series of specimens soon made it evident that very little could be accomplished by the methods of the early students. Up to this time all the descriptions of American *Prosopis* had been based entirely on external characters, usually color or sculpture, and without any figures whatever, except in one or two species. Further than this many of the species had been described from only one or two specimens, distinguished by some minor difference in markings or puncturation. As a result the entire genus was thrown into confusion, and any work done recently made doubly difficult by the difficulty of recognizing the early "species". In fact many of these can only be identified by an examination of the types, and in some cases where the types are lost, even this is impossible. Little weight, therefore, could be given to published descriptions as a whole, and much of the work of preparation has been done in accumulating a series of reliably named specimens for reference. This has been quite successful, considering the fact that very few named specimens of some species are in existence, and a few are found only in European collections. Except for a few of the oldest, which are in Europe, and a few of the later ones which are known only by their unique types, I have examined specimens of a very large part of the described species. For this privilege I am especially indebted to Messrs. Swenk and Cockerell, who have given me access to the entire collections of the Universities of Nebraska and Colorado respectively, which contain a number of the types. From this material I have been able to bring together a study collection including almost all of the known species. Others not actually examined and not easily recognizable have been treated separately as "Uncertain Species."

At no previous time in the history of American Hymenopterology has anyone made any serious attempt to treat the American species of *Prosopis* as a whole. Previous work con-

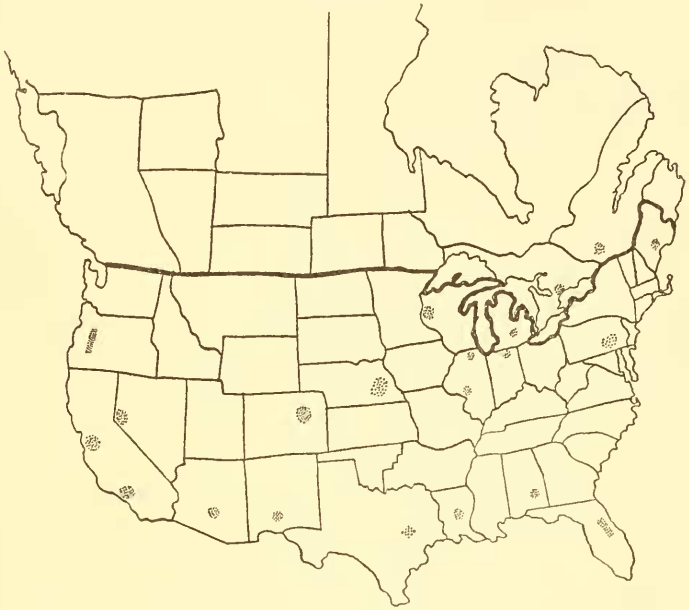
sists entirely of scattered descriptions here and there, with once in a long while a paper dealing with the species of *Prosopis* in a certain locality, or with some small circumscribed group of species. The chief factor, outside of lack of material, to prevent more complete studies of late, has probably been the great confusion which exists in the descriptions. Because of the published work being so scattered and so often unintelligible, very few if any writers have known just what species had been previously described, and as a result several have been repeatedly redescribed. In other cases where only a few specimens were obtained, distinctions have been based upon merely minor characters, which prove absolutely worthless in a large series. All of these conditions taken together make the work of revising the genus unusually difficult and unsatisfactory.

The author has endeavored in the present paper to treat all of the North American species, exclusive of Mexican. A systematic treatment of the males has been quite possible, but among the females confusion still exists, and will continue to exist in many cases until some other distinctive characters are discovered. This is especially true of a few species which are widely distributed and exceedingly variable. An illustration will be valuable here not only to show the variation which one may expect to find, but also to show the futility of describing, as many writers have done, and are doing, new species based upon minor differences in size, sculpture, or color, and often using for this purpose only one or two specimens. The little species *P. cressoni* Ckll. is distributed over the whole of North America so far as known, from sea-level to the highest mountains, and thruout its range shows a wonderful series of variations and forms. Some of the variations in the yellow face markings are shown in figures 77–83, and 124–129. In thoracic markings a like variation occurs, extreme southwestern forms having a large amount of yellow on collar, tubercles, and legs, as well as face, while other forms are sometimes entirely dark in the females, except perhaps for a spot on the base of the hind tibiæ. In size they vary from the smallest, which are little

thicker than a good sized pin, to the largest which are of several times their bulk. Likewise in puncturation a wide range of variation is found, which will be discussed later under the species. In this series four or five forms could be selected which would undoubtedly stand as distinct species in the absence of the rest, but in the complete series their identity is utterly lost among the intermediate forms. Out of this group several species have been described and have stood as such for years, but they are unquestionably only forms or varieties. In two or three other species of wide range this same condition exists, causing great confusion. As might be expected the most variable species are those occurring in the greatest numbers, and over the greatest territory *P. cressoni* and *P. modestus* being striking examples. These two species include a relatively large part, (about one-fouth) of the collections as a rule; and the fact that they show such variability makes it more probable that other species will show a similar tendency when collected in large numbers, and when their entire range is worked over.

At present very little can be said about the distribution and ecology of the genus. So little material has been obtained, and this from such small and widely separated localities, that only an infinitesimal part of what will be necessary for adequate treatment, has been collected. The shaded areas on the accompanying map are intended to show approximately the ground covered up to the present time, and to emphasize the fact that we know comparatively nothing of the genus. The shaded areas cover many times the regions actually worked, which would be better represented by mere dots. Before any really comprehensive work can be done, then, large collections must be built up, including series from intermediate localities. The importance of collecting in large series cannot be too much emphasized, for it is only in this way that any reliable and usable knowledge of our bees can be obtained. At present only two of our species of *Prosopis* are known reasonably well, and these are *P. cressoni* and *P. modestus*. Of the former I have about one thousand specimens, and of the latter about two hundred and

fifty, representing in both cases many widely separated localities, and including many large series. Only with such series as this can a fair idea of any species be obtained.



With the preceding facts in mind we can more readily understand why the older descriptions of *Prosopis* species are so unreliable and confusing. The work of the oldest writers, Smith, Kirby, and others, is practically useless, except as supplemented by later descriptions. Following the natural tendency they characterized their species by the general form and amount of the yellow markings and the general size of the insect, these being the most conspicuous features. The characters which they were accustomed to use in other genera were lacking in this, and they consequently took the most conspicuous they could find. The bees being practically naked no use could be made of pubescence, and being so homogeneous in the structure of the legs no distinctions could be based on these. Consequently they overemphasized the color characters and size. The latter is such a variable

character as to be almost worthless except when supplemented by other characters; and the former when used in such a general way as "face below antennæ yellow," is also worthless, since it may fit any one of several species. Most of the earlier papers, then, must be ignored unless supplemented by later ones.

Subsequent writers, realizing the inadequacy of the early papers, went considerably more into detail; but they too in many cases based their distinctions on utterly inconstant differences. One of the most confusing of these is the color and venation of the wings, which has been emphasized strongly by some. The actual shade of the wing, whether darkened or not, is of no value whatever, as almost any large series of specimens will show; and the minor differences in wing venation such as, "second submarginal cell little narrowed toward marginal" or "first recurrent nervure entering second submarginal cell", show as much variation in a species as between species, and should not be used. Another character causing confusion is the presence or absence of a spot on the tegula. This is probably the most variable of the color markings, and yet it has been repeatedly used as a diagnostic character. Along with these a number of color characters have given trouble. Certain of them, such as the yellow on the collar or the shape of the face marks, are valuable characters, *if shown to be fairly constant*, and furnish very easy means of distinguishing species which are also differentiated by other characters. In some species, however, and when not supported by a large series, they cannot be depended upon. This fact, as already mentioned, was formerly overlooked, and in consequence we have numbers of specimens described as new because of some such difference. In the species *modestus* alone, no less than eight or ten, and perhaps more, forms have been described as new species for this reason.

Up to 1911 fifty-eight species of *Prosopis* had been described from the United States and Canada. The number is not large in comparison with that of other allied genera, but in the final analysis probably not more than one-third or one-

half of these will stand. In the present work it has been possible to recognize about twenty species as certainly distinct, and ten or twelve more, as yet but little known, which may be distinct. A number of the species, however, were originally described from females that have since been associated with the males, so about half of the species originally described from males are probably valid.

The association of the sexes in *Prosopis* is extremely difficult, indeed practically impossible in some cases, unless the specimens are actually taken in copula or reared. In the males as a rule an entirely different set of characters is used for identification than is used in the females, and occasionally the two sexes are so entirely different in general appearance that they cannot be certainly associated with our present knowledge. The proportions of the parts of the face, altho of great value in determining species in each sex, are of little use in associating the sexes. In face markings the sexes never agree, altho they often show the same tendency; and in thoracic markings they may or may not agree, altho here also the same tendency toward a large or small amount of color is observed. In sculptural characters a greater constancy is found, and often the sexes can be determined with a considerable degree of accuracy in this way. In actual practice all these characters must be taken into consideration in associating the sexes, and also the locality records must be considered. Many of the species can be associated with a fair degree of accuracy in the latter way if a large series is obtained.

Not only is it often very hard to associate the females with the males, but in some cases it is very hard to separate the females of nearly related species among the wide range of varieties. In this sex the entire group is extremely uniform, and is lacking in those characters which distinguish the males. The face marks are less pronounced and less constant than in the males, and the swollen scape of some of the latter is not found at all in these. Consequently in species having closely allied males, the females are usually so near alike or intergrade so much that accurate separation

is impossible. This is especially true of the group of species most nearly related to *P. cressoni* and *modestus*.

Fortunately there is a group of characters in the males which usually makes separation in that sex a simple matter. These are the characters of the genitalia; the genital armature and the retracted seventh and eighth ventral plates. These organs are very charateristic and easily recognized, and as a rule are extremely constant. In the present work over two hundred dissections of these have been made, and in nearly all cases it was evident at a glance to which species they belonged. In only one species are they really variable, and then but slightly. This is the species *modestus* which is extremely inconstant in all characters.

By means of the genitalia the genus is naturally divided into three very distinct groups or divisions, which include all the species except the peculiar *basalis*. These I have called the "Modestus Division", the "Cressoni Division" and the "Asininus Division", after three characteristic species in them. The males can also be separated into these three groups by the character of their face marks, as will be seen later. The more similar the species are in external characters the more similar are their genitalia, or vice versa, and the relationship seems to be especially close between the face markings and the genitalia, without much regard to sculpture or size. There are, however, some exceptions like *P. coloradensis*, in which the face marks are very different from, and the genitalia almost identical with some other species.

The genus *Prosopis* is apparently rapidly evolving and the path of the developments can often be quite plainly followed. The species *modestus*, again, is peculiar in this respect. It seems to be in the process of breaking up into distinct groups, and this apparently affects all its characters. The series of figures of the seventh ventral plate (69–72), and the face marks (93–100) of the species will illustrate this point. In a few instances, on the other hand, the evolution has not affected the genitalia, but has exhibited itself in other characters. *P. episcopalis*, for example, is practically identical

with *P. modestus* in genitalia, and yet is quite different in sculpture. A more striking example is that of *P. fossata* n. sp. which is exceedingly different in sculpture, and even in the proportions of the thorax, from *P. modestus*, and yet has similar genitalia. It is noteworthy, also, that in each of these cases the face marks are very similar.

With such characters in the males, then, there is little chance for confusion in that sex, and very little excuse for describing a new species that is not easily recognizable by either external or genital characters. It should be a rule in this genus that to warrant specific separation an insect should have distinct and characteristic genitalia, or very strongly marked and thoroly diagnostic external characters, or else characters that are shown by a large series of specimens to be reasonably constant, otherwise confusion will almost certainly result. It should also be made a rule to never describe a new species from a female specimen. The types should invariably be males, and the females afterwards associated with them, if anything like satisfactory work is to be done; for the descriptions of females are almost always such that no student could recognize them with certainty. In the material accumulated by the writer are a number of undetermined females which could be described as new, but to do so would simply add to the difficulties in the genus, so they will remain among the indeterminates until the males are found. Likewise in the list of uncertain described species at the end, will be found a number of females, most of which might be referred to almost any of the known species from the descriptions. As long as there are so many species having females in which there are no really plain, easily recognizable characters, it is pure folly to describe a specimen as new which could in any way be confused with others, and those females which cannot be so confused are very rare. These difficulties will become more apparent when the descriptions of the females included in the present paper are examined. That they are unsatisfactory is certain, but so long as there is such great variation in the few diagnostic characters that are available the trouble will remain. At present it has seemed best to describe a typical female in

each case, and then refer to the existing variations in the discussion. By this means the typical forms can usually be separated, from a study of which the rest may more easily be grouped.

The following is a list of characters that have at some time been used, and a brief statement of their values in classification:

Size.—Quite variable in both sexes, and only of use in connection with other characters.

Wings.—Venation, shade, and yellow spot at base all variable and useless.

Legs.—Size and shape uniform and furnishing no characters; markings of comparatively little value.

Antennæ.—Color useless, except when on scape, and then of only secondary importance; size and form of the scape useful in the males.

Thorax.—Markings on collar and tubercles of value *when constant;* but often not constant; other marks useless; puncturation valuable within moderate limits, but not absolutely constant in any species; enclosure of propodeum likewise variable, and not certain.

Abdomen.—Shape and puncturation valuable in both sexes if distinct, otherwise not.

Head.—Puncturation quite useful, especially that of occiput; proportions, position of antennal sockets, etc., valuable in both sexes, except in a few cases; markings valuable in the male when constant; less so in the female; shade of markings valueless.

Genitalia.—Very valuable in the male, especially seventh and eighth ventral plates.

A word about the collecting and handling of specimens might well be added at this point. First of all it is essential that *large series* be collected, if valuable work is to be done. Next in importance is full and accurate data, for it is only by such means that the range, habitat, and time of appearance can be learned, or a record of the flowers visited by each species obtained. It will also add to the value and facilitate the study of the specimens if they are glued on cardboard points, instead of being pinned thru the thorax, for the pin distorts the specimen and interferes with the lens in examining it. Especial pains should be taken to get specimens in copula, and preserve them on the *same pin*, for

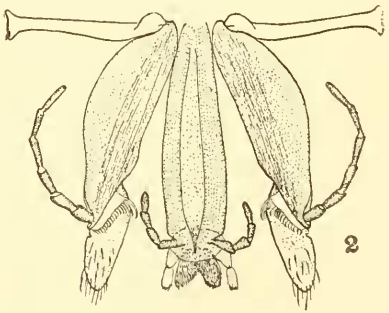
in this way only can the sexes be associated with certainty. In cyanide cans the yellow markings may turn to orange, but no harm is done, for the shade of color is usually of no value anyway.

The breeding and rearing of specimens offers a very attractive field in this genus, and may solve some of the most intricate problems. In this way it can be determined whether some of the species are really distinct, or whether the females that are so similar are of one species and have polymorphic males. At present there is no way of ascertaining this, but from the indications it is not at all improbable that such a condition exists. If so it will greatly simplify matters to have accurate knowledge of just where, and to what extent this is true. Nests of Prosopis containing larvæ or pupæ can often be found in the hollow dead stalks of many common pithy weeds or canes, and it is to be hoped that collectors will take pains to obtain such material whenever possible.

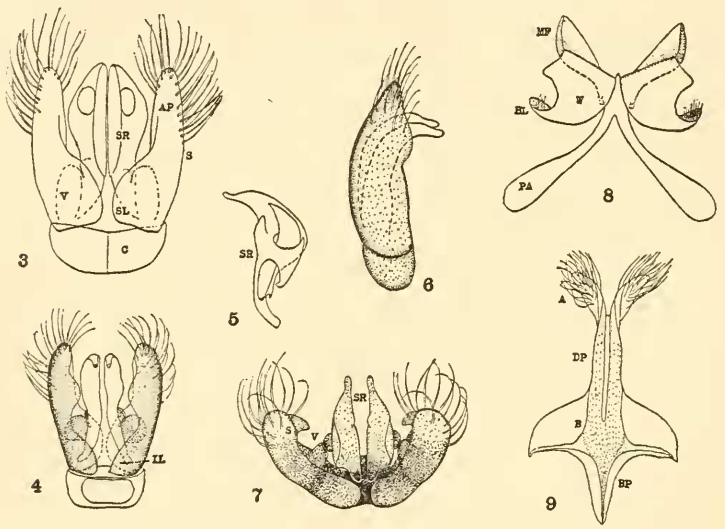
Genus **PROSOPIS,** Fabricius.

Generic characters.—Tongue short, broad, obtuse, emarginate at apex. Marginal cell at apex acuminate or narrowly rounded, never truncate. Body bare or nearly so. First cubital cell much longer than second. Maxillary palpi six jointed; labial palpi four jointed. Usually small black bees with yellow markings.

In America bees of this genus are easily recognized by their black color, small size, absence of pubescence, and presence of yellow markings, together with the short tongue and two cubital cells. The mouth parts apparently show no variation whatever, that could be used in specific diagnosis. A series of twenty or thirty mounts from different species are identical in form and agree essentially with the figure given, (fig. 2).



Genital characters.—The male genitalia consist of three separate organs—the genital armature, and the modified seventh and eighth ventral plates. The former is a very complicated structure and hence of less value than the others in classification. Following the nomenclature proposed by Rev. Morice and adopted by several writers in this country, the parts of the armature are as follows: A large, hollow, transparent base (C, fig. 3) the *cardo*, from which project



two tubular *stipites* (S), and two long chitinous rods the *sagittæ* or *sagittal rods* (SR), with a couple of large, dark, rounded structures at their base called *volsellæ* (V). The character of these parts can best be understood by an examination of the figures (3–7). Each outer, tubular rod or *stipes* consists of a long, half open cylindrical sheath, at base attached to the cardo, and at the apex more or less closed; near its base it usually broadens out into two lobes or stationary flaps, which I have designated the *superior* and *inferior lobes* (SL and IL); beyond the lobes is the *apical portion* (AP), which is usually narrower and covered with hairs on its inferior surface. The inner rods or *sagittæ*, are peculiar, long structures, composed of a number of chitinous strips or

plates, connected by membranes. They are somewhat bow-shaped and flattened, with the narrow side up. Owing to their delicate structure and the ease with which they are distorted, they cannot be depended upon for specific characters. A side view of one of the *sagittæ* is shown in figure 5. The *volsellæ* (V) are stout, vice-like structures, each with two jaw-like lobes; they seldom vary noticeably in the genus, so are of little importance in classification. The *seventh ventral plate* (fig. 8) consists of two arm-like projections, the *proxi-*

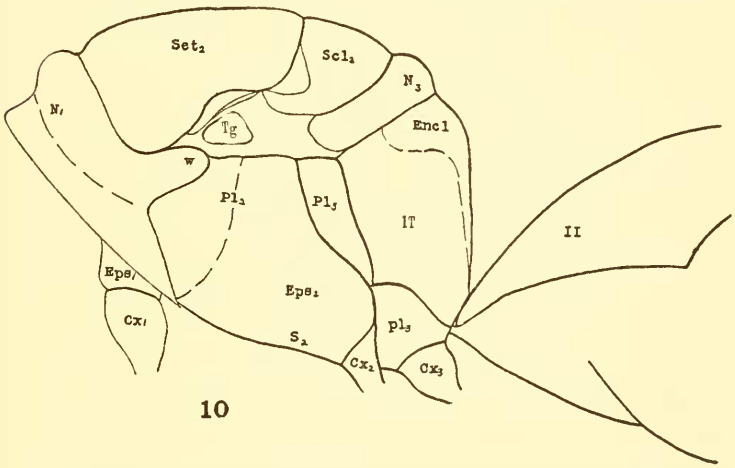


FIG. 10.—*Thorax of Prosopis.* N_1, Pronotum; w, Posterior lobe of Pronotum showing location of tubercle; Sct_2, Mesoscutum; Tg Tegula; Pl_2, Mesopleurum; Eps_2, Mesoepisternum; S_2, Mesosternum; Scl_2, Mesoscutellum; N_3, Metanotum; Pl_3, Metapleurum; pl_3, subdivision of Metapleurum; IT, Propodeum; Encl, Enclosure of Propodeum; II, Second abdominal tergum; Cx, Coxa.

mal arms (PA) for attachment, uniting at their apices, where are fastened the two broad, thin *wings* (W). The wings differ greatly between species, and furnish some of the most valuable diagnostic characters. Each is composed of the wing proper, to which may be attached a *membranous flap* (MF); and which may be modified at base into some sort of a lobe (BL). The *eighth ventral plate* (fig. 9) is usually quite simple, being composed of a body (B) with four projections. The lateral projections are for attachment to the seventh ventral plate, and do not vary appreciably. The

basal projection, or *basal pedicel* (BP), altho free, is also very similar in all species. The apical projection, or *distal pedicel*, however, shows a wide range of modifications. When well developed it is rather long and slender, terminating in two *apical lobes* (A), which furnish excellent characters. More detailed descriptions of the various types of ventral plates will appear under their individual headings.

Thoracic nomenclature.—The nomenclature adopted in the present paper is that proposed by Snodgrass in, "*The Thorax of Hymenoptera*," (Proceedings of the U. S. National Museum, XXXIX: 37–91, 1910). The most important changes from the old nomenclature are in the thoracic segments, as shown in figure 10. The area formerly designated "postscutellum" is now called the "metanotum", and that designated "metathorax" has been changed to "propodeum". It is important to note these changes in comparing the accompanying descriptions with former ones, especially the change in the term "metathorax" to indicate an entirely different segment. Other changes will be evident from the figure.

To facilitate discussion of the face markings, and the parts of the face I have applied the term "lateral area" of the face, to that portion between the orbit, the clypeus and supraclypeal space, and below the base of the antennal socket, on each side. This does not include any space above the antennal socket, whether covered by the face marks or not.

KEY TO MALES.—Based on external characters.

Very large, scape enormously swollen, "heart shaped", covering face above antennal sockets (fig. 92).....**basalis.**

Lateral face marks conspicuously divergent from orbital margin above and curving around antennal sockets.....1.

Lateral face marks confluent with or not noticeably divergent from orbital margin.....4.

1. Lateral face marks clavate above or stout, not tapering to tip.....2.
   Lateral face marks short above, upper extensions not clavate, but tapering to a point at apex.....3.
2. Large, upper extensions of lateral face marks greatly enlarged at apex, (fig. 91), antennal sockets very close together, scape and collar with yellow, scape dilated.....**conspicua,** n. sp.

Smaller, upper extension of lateral face marks narrowed at base, and remote from orbital margin, (fig. 89).....**rudbeckiæ.**

Very small, scape not dilated, upper extension lateral face marks rather stout, not greatly constricted at base, not enlarged greatly at apex (fig. 78), collar dark.....**cressoni.**

Similar to *cressoni* but upper extensions of lateral face marks swollen at apices, (fig. 77) ...**cressoni** var. **magniclavis.**

Similar to *cressoni* but face marks irregular and broken, (fig. 83), not extending above antennal sockets.

cressoni, form **saniculæ.**

3. Large, abdomen coarsely punctured, (fig. 86) .....**tridentulus.**

Small, abdomen impunctate or nearly so, (fig. 87).

grossicornis (type).

4. Supra-clypeal mark absent.....5.

Supra-clypeal mark present.....6.

5. Lateral face marks long, tapering above to tip, (fig. 114).

polifolii.

Lateral face marks short, not tapering gradually to tip well above antennal sockets, (fig. 115) .....**nevadensis.**

6. Rather large, upper extension of lateral face marks truncate at upper level of antennal sockets, with horizontal projection mesad above sockets, (fig. 85) .....**varifrons.**

Lateral face marks not extending above antennal sockets, face exceedingly broad, (fig. 106)..... .....**potens,** n. sp.

Lateral face marks broadening above antennal sockets, then tapering to a more or less narrow apex on eye margin, abdomen punctured, but not coarsely.....7.

Lateral face marks extending well above antennal sockets, broadened and truncate or rounded at apex, scape concave exteriorly, not dilated.....**ziziæ.**

Lateral face marks not noticeably enlarged above antennal sockets. either short or narrow.....8.

7. Large, upper extension of lateral face marks long and very stout, face broad, (fig. 108).....**megalotis.**

Similar but face long, and narrow, lateral face marks with upper extensions not so stout, more narrowed at tip, (fig. 109).

asininus.

Very small, face broadened above, not narrow, (fig. 111).

cookii, n. sp.

8. Abdomen coarsely, heavily punctured.....9.

Abdomen impunctate, or with moderate sized punctures .....10.

9. Upper extension of lateral face marks extending about one-half the length of scape above sockets, (figs. 103 and 104).

episcopalis.

10. Face marks similar to *episcopalis*, entire body coarsely punctured, deep fossa on posterior face of propodeum...**fossata,** n. sp.
    Small, lateral face marks short and very broad, supra-clypeal area very narrow, (fig. 107), abdomen punctured..**coloradensis.**
    Similar to *coloradensis*, but lateral face marks not extending above antennal sockets, supra-clypeal area not so narrow, (fig. 110). **calvus,** n. sp.
    Lateral face marks narrow, tapering to a point not far above sockets, supra-clypeal area not extremely narrow, abdomen punctured, Western N. A.....**wootoni.**
    Face marks usually extending above antennal sockets, but not enlarged above, abdomen impunctate or nearly so, scape stout without yellow, (figs. 93–100).....**modestus.**

KEY TO MALES.—Based on genital characters.

Eighth ventral plate without any distal pedicel..**basalis** and **potens.**
Eighth ventral plate with short, truncate distal pedicel, without apical lobes, hairless .....1.
Eighth ventral plate with distal pedicel bearing apical lobes .....2.
1. Wing of seventh ventral plate broad, somewhat ovate, rather heavily haired, without basal tuft, (fig. 29) .....**ziziæ.**
   Wing of seventh ventral plate narrowed toward apex, with more or less prominent lobe at base, (figs. 69–76). **modestus, episcopalis, fossata** n. sp.
2. Seventh ventral plate without tooth-like processes or flap, (fig. 60). **cookii** n. sp.
   Seventh ventral plate with tooth-like processes and membranous flap.. .....3.
   Seventh ventral plate without tooth-like processes. with hairless membranous flap.....6,
3. Apical pedicel of eighth ventral plate with dark, chitinous, more or less horn-like projections, (fig. 49).....4.
   Apical pedicel lacking these projections .....5.
4. Basal part of seventh ventral plate long and narrow, (fig. 44). **conspicua.**
   Basal part not so narrowed, (fig. 37) .....**rudbeckiæ.**
5. Lobes of eighth ventral plate granulated, stout; teeth of seventh ventral plate short, (figs. 52 and 38).....**cressoni.**
   Eighth ventral plate not granulated; seventh ventral plate with short wings, teeth long and narrow; eighth ventral plate long, (figs. 46 and 43) .....**tridentulus.**
   Similar to *tridentulus*, but small, eighth ventral plate short (Figs. 48 and 42) .....**grossicornis.**
   Apical lobes of eighth ventral plate broad, flat, with short spines; base of wings of seventh ventral plate very long, (figs. 45 and 41).....**varifrons.**

6. Both ventral plates nude, (figs. 63 and 59).....**calvus,** n. sp.
Seventh ventral plate lacking basal lobe of wings; eighth ventral plate short, stout, (figs 61, 62).....**nevadensis.**
Seventh ventral plate with small, ear-like membranous flaps, not apical, (figs. 55 and 67) .....**asininus.**
Membranous flap apical, broad, basal lobe long narrow (fig. 57). **polifolii.**
Similar to *polifolii*, but basal lobe short.
megalotis, wootoni and **coloradensis.**

KEY TO FEMALES.

No satisfactory characters for distinguishing all the females have yet been found. The following is intended to aid in separating them into groups, which are treated separately under their individual headings.

Very large, enirely black.....**basalis.**
Very small, face entirely dark.....**cressoni** group.
Abdomen impunctate or nearly so, face marks short..... .....1.
Abdomen impunctate or nearly so, face marks long, extending above antennal sockets.....2.
Abdomen conspicuously punctured, lateral face marks long.....3.
Abdomen conspicuously punctured, lateral face marks short.....4.
1. Large, 7 mm. Yellow on collar and usually on clypeus, (fig. 135), thorax finely, densely punctured, Wes. U. S....**conspicua.**
Similar but smaller, 4–5 mm., punctures of thorax sparse, tarsi dark, lateral areas of face narrow, (fig. 137).....**rudebeckiæ.**
Similar but very small, tarsi yellow ....**cressoni** form **mesillæ.**
Similar but collar and tarsi dark, very small .....**cressoni** group.
Rather large, 6 mm., collar yellow, puncturation moderate, East United States.....**modestus** group.
Large, stout, face marks very small, collar dark, (fig. 130). **varifrons** and **episcopalis.**
Collar yellow, lateral face marks mere strips, lateral areas broad, Wes. U. S., (fig. 117).....**coloradensis.**
2. Face marks filling lateral areas, long, triangular, (figs. 138 and 139). **ziziæ, episcopalis.**
Collar yellow, puncturation of thorax exceeding coarse .....**fossata.**
3. Collar yellow, lateral face marks continue broad to truncate apex far above antennal sockets.....**asininus, megalotis.**
Lateral face marks narrow, long, abdomen very finely punctured, (figs. 118, 122).....**wootoni, polifolii.**
4. Abdomen very finely punctured, but closely so. **nevadensis** and **cookii.**

PROSOPIS BASALIS Sm., 1853.

1853. *P. basalis*, male, female. Sm. Cat. Hym. Brit. Mus. 22 : 23.
1869. *P. basalis*, Cr. Proc. Bos. Soc. Nat. Hist. 12 : 269.
1882. *P. basalis*, Prov. Nat. Can. 13 : 258.
1883. *P. basalis*, Prov. Faun. Ent. Can. Hym. 1 : 726.
1890. *P. basalis*, Ckll. Can. Ent. 22 : 39.
1890. *P. basalis*, Ckll. Bull. Colo. Biol. Assn. 1 : 31.
1894. *P. basalis*, Harrington. Can. Ent. 26 : 14.
1896. *P. basalis*, Evans. Can. Ent. 28 : 12.
1896. *P. basalis*, Ckll. Psyche Supp. 7 : 26.
1901. *P. basalis*, Lov. Ent. News. 12 : 4, 7.
1901. *P. basalis*, Ckll. Psyche. 9 : 283.
1903. *P. basalis*, Ckll. Psyche. 10 : 74.
1904. *P. basalis*, Vier. Can. Ent. 36 : 93.
1906. *P. basalis*, Ckll. Bull. Am. Mus. Nat. Hist. 22 : 423.
1910. *P. basalis*, Lov. Psyche. 17 ; 185.

Male.—Easily known by its large size, enormous "heart shaped" scape, peculiar marks, heavy punctures, etc.

Length about 9 mm. Head broad, large ; scape enormously swollen, flattened, almost circular in outline, covering face above antennal sockets ; clypeus short, broad as long, very narrow at base ; lateral areas very broad ; supraclypeal area extremely narrow and long ; antennal sockets placed very close together, (fig. 92). Thorax and abdomen stout, the former comparatively heavily haired, with rather long white pubescence, the latter with apical bands on first two segments. Propodeum short, slanting, superior face not longer than metanotum ; posterior face large, margins not rounded.

Sculpture.—Front, vertex, occiput, pronotum, mesonotum, and pleura densely, but not coarsely punctured ; metanotum rugulose ; enclosure of propodeum small, narrow, bowl very short and narrow, neck long ; surface of bowl rugose, not pitted ; remainder of propodeum rugulose. Abdomen ; dorsum heavily punctured, first segment more sparely than remainder ; venter slightly punctured.

Yellow Markings.—Lateral face marks very broad, filling lateral areas, and narrowing to eye margin above ; supraclypeal mark filling supraclypeal area below antennal sockets, and extending above in a very narrow, pointed process. Scape with lateral half orange or yellow (fig. 92). Thorax entirely dark. Legs with anterior tibiæ in front, middle and hind tibiæ at base, and middle and hind basitarsi yellow.

Genitalia.—Armature entirely different from that of any other species. Stipes long, broadening apically, ending abruptly, not in a rounded apex as usual, but flat, with a membrane connecting the edges like a drum head, fringed with long hairs ; superior lobe very small, corresponding to a similar inferior lobe; sagittal rods poorly developed, largely membranous, short ; volsella, moderate in size, (fig.

32). Seventh ventral plate also unique; lateral wings not separate attachments, but enlargements of the proximal arms; apical portion of the lateral margin with long spine-like hairs; basal portion with tuft of fine hairs, (fig. 36). Eighth ventral plate merely a triangular body, without apical pedicel, (fig. 34).

Female.—Easily known by its large size and entire lack of yellow markings. As large, or larger than male which it resembles in general characters, but scape normal.

Sculpture.—Puncturation much more light than in male. Enclosure of propodeum smooth, lateral faces slightly punctured instead of rugulose. Abdomen practically impunctate.

Yellow Markings.—Entirely lacking.

Habitat.—Apparently not restricted in the United States. This species has been reported from nearly every portion of the country where much collecting has been done, but it is not common in any locality.

This, the largest species of *Prosopis* in North America, is so entirely different from any other known species in this country that there is no chance for confusing it, in either sex. Just the range of variation in the species is not known. Eight specimens before me from Colorado, New Mexico, and South Dakota show practically none, but in puncturation they all differ considerably from the original descriptions, which state, "basal segment of abdomen very smooth and shining" for both sexes. As Smith's work was probably done largely with a hand lens this apparent difference may not be true.

PROSOPIS POTENS n. sp.

Male.—Distinguished by its short, broad head, stout clypeus, both of which resemble *P. basalis* in form, by its short, heavy lateral face marks, and by its very distinct genitalia.

Length about 6–7 mm.; stout, head very broad; clypeus broad as long, somewhat narrower at base than lateral areas at same level; lateral areas unusually broad; supraclypeal area broader than long below base of antennal sockets. Scape stout, concave posteriorly. Thorax stout; metanotum comparatively long, two-thirds length of scutellum; propodeum short, with no distinct superior face, slanting off directly from base.

Sculpture.—Puncturation of entire body remarkably light. Front, and part of vertex with small, shallow, close punctures, not extending onto occiput or cheeks; pronotum not prominent, indistinctly punctured; mesoscutum sparsely punctured with small, round punctures,

separated by two or three times the diameter of one puncture; scutellum similarly, but more sparsely punctured; metanotum finely roughened. Bowl of enclosure of propodeum long and narrow, not widened abruptly at base of neck, surface smooth, not pitted, margin indistinct; neck of enclosure medium sized, not broad; lateral areas of posterior face smooth, not punctured, microscopically wrinkled; sides similar. Mesopleura extremely sparsely punctured, with small round punctures as on mesoscutum, separated by three to five times the diameter of one puncture; metapleura almost smooth, not depressed. Abdomen impunctate, not glossy.

Yellow Markings.—Lateral face marks very broad and short, filling lateral areas, ending abruptly on level with upper level or antennal sockets; supraclypeal mark broad, not extending up between antennal sockets, (fig. 106); stripe on front of scape yellow. Thorax dark, except for a small spot on tubercles; legs with front of fore tibiæ, base of hind tibiæ, and all basitarsi yellow.

Genitalia.—Very distinct; armature stout; cardo very short and small, superior lobe of stipes inconspicuous, apical part swollen, pointing mesad at tip, and with long coarse hairs; sagittæ and volsella not peculiar, (fig. 35). Seventh ventral plate of the same general type as that of modestus, but apical portion of wings not attenuated, and basal lobe long, extending out at an angle of about forty-five degrees, and bearing an apical tuft of fine hairs; lateral and apical marging with a fringe of heavy hairs, (fig. 31). Eighth ventral plate similar to that of *P. basalis*, but smaller, (fig. 33).

Femate.—Unknown.

Habitat.—Unique type from Montreal, Queb., June 10, 1906. In collection of C. F. Baker, Pomona College.

This species resembles members of the "Modestus Division" in size, and form, but is very different from any of these. Its broad face, and rudimentary eighth ventral plate resemble those of *P. basalis*, from which it is easily told by the scape and puncturation. The genital armature, and both ventral plates are easily distinguished from any of the other species. Probably the face marks will be found somewhat variable in a series, for they are not clear cut, as the figure shows. Likewise the puncturation may not be uniformly faint and sparse, but the form of the propodeum will probably be constant. Possibly this is one of the species which has been described before, but is indistinguishable from the modestus group in the description; or it may be included in the list of uncertain forms at the end. In any case it is unrecognizable from the previous description.

CRESSONI DIVISION.

This division is characterized in the males by the presence of a number of tooth-like projections, forming a sort of comb on the outer margin of each wing of the seventh ventral plate; and also by the upper extensions of the lateral face marks, which diverge from the orbital margin, or project mesad above antennal sockets. Within the division are three smaller groups. The first includes *P. cressoni*, *P. rudbeckiæ*, etc., distinguished by having short, stout, teeth on the seventh ventral plates, and stout, or clavate upper extensions of the lateral face marks. The second group has short winged seventh ventral plates with long, narrow teeth, and has short, tapering upper extensions of the lateral face marks: this includes *P. tridentulus*, and *P. grossicornis*. The third includes only one species, *P. varifrons*, having long, narrow wings of the seventh ventral plate, and quite different eighth ventral plate and face marks from the others. The division is not restricted geographically, representatives being found in all parts of the country, but it is best represented in the Rocky Mountain States.

PROSOPIS CRESSONI Ckll. 1907.

1869. *P. pygmæa*, Cr. Proc. Bos. Soc. Nat. Hist. 12:272.
1895. *P. pygmæa*, Rob. Tr. Amer. Ent. Soc. 22:116.
1896. *P. pygmæa*, Rob. Can. Ent. 28:136.
1898. *P. pygmæa*, Ckll. Ent., 1898, p. 217.
1899. *P. pygmæa*, Ckll. Ent. News. 10:3.
1901. *P. pygmæa*, Lov. Ent. News. 12:5.
1901. *P. pygmæa*, Lov. Ent. News. 12:78.
1904. *P. pygmæa*, Rob. Can. Ent. 36:273.
1906. *P. pygmæa*, Bull. Amer. Mus. Nat. Hist. 22:423.
1907. *P. cressoni*, Ckll. Ann. and Mag. Nat. Hist. Ser. VII. 20:131.
1909. *P. pygmæa*, Lov. Ent. News. 10:3.
1910. *P. pygmæa*, Lov. Psyche. 17:178.

Syn. (*P. pasadenæ*, Ckll.).

1810. *P. pasadenæ*, Ckll. Ann. and Mag. Nat. Hist. Ser. VIII. 5:30.

Syn. (*P. labiatifrons*, Ckll.).

1896. *P. labiatifrons*, Ckll. Psyche. 7:437.
1901. *P. labiatifrons*, Lov. Ent. News. 12:7.

P. cressoni, form MESILLÆ (Ckll.).

1895. *P. subtilis*, Fox, (female). Tr. Amer. Ent. Soc. 22 : 295.
1896. *P. mesillæ*, Ckll. (male). Can. Ent. 28 : 42.
1898. *P mesillæ*, Ckll. Can. Ent. 30 : 237.
1901. *P. mesillæ*, Lov. Ent. News. 12 : 9.
1901. *P. mesillæ*, Ckll. Ent. News. 12 : 39.
1903. *P. mesillæ*, Ckll. Psyche. 10 : 74.
1904. *P. mesillæ*, Vier. Can. Ent. 36 : 93.

P. cressoni, form SANICULÆ (Rob.).

1896. *P. saniculæ*, Rob. Can. Ent. 28 : 137.
1896. *P. saniculæ*, Ckll. Psyche. 7 : 438.
1901. *P. saniculæ*. Lov. Ent. News. 12 : 5.
1904. *P. saniculæ*, Rob. Can. Ent. 36 : 273.
1910. *P. saniculæ*, Lov. Psyche. 17 : 179.

P. cressoni, var. MAGNICLAVIS (Swk. and Ckll.).

1910. *P. magniclavis*, Swk. and Ckll. Ent. News. 21 : 68.

Typical Male.—Small, 3–5 mm. Distinguished by small size, dark collar, and clavate, divergent (from orbit) upper extenson of lateral face marks, which are not greatly narrowed at base.

Very small, rather stout; face broad above, rapidly narrowing below; clypeus rather short, base about equal in breadth to lateral face marks at same level; scape short, stout, slightly concave exteriorly.

Sculpture.—Front and vertex closely, confluently punctured, punctures not extending onto occiput or cheeks; mesonotum moderately punctured with small round punctures; scutellum similarly but more sparsely punctured; metanotum rugulose or confluently punctured. Propodeum normal; bowl of enclosure broad, pitted; neck narrow; lateral areas of posterior face almost smooth; sides rugulose. Mesopleura rather closely punctured with larger punctures than those of mesonotum; metapleura striate. Abdomen impunctate, except for a few sparse punctures of first segment.

Yellow Markings.—Supraclypeal mark usually long, extending above antennal sockets; area below antennal sockets quadrate; lateral marks filling lateral areas and extending upward in long, rather stout, somewhat clavate extensions, leaving orbital margin on level with base of antennæ, and projecting mesad, ending in slightly swollen tips above antennal sockets, (figs. 78, 79). Scape with yellow stripe in front; tubercles with large yellow spot; front of fore tibiæ, basal third of middle and hind tibiæ, and basitarsi yellow.

Genitalia.—Armature rather short and stout; cardo short, rounded; stipes stout, superior lobe broad and long, extending about two-thirds of way to apex, where it curves in almost abruptly; apical portion stout, more or less rounded at tip, moderately haired, with a tuft-like

patch near apex; sagittæ normal (flattened in figure), (fig. 16 is identical in form with this). Seventh ventral plate with rather slender, somewhat triangular wings, having rather short teeth in the comb-like margin, which extends along about two-thirds of the length; membranous flap transparent, extending laterad, covered with fine hairs, (fig. 38). Eighth ventral plate short; base normal; distal pedicel narrow, ending in two rounded apical lobes, connected on one side by a membrane; lobes granular in appearance, possibly caused by short spines, slightly haired at apex, (fig. 52).

Typical Female.—Agrees with male in general characters; antennæ short and clavate, scape narrow. Punctures of thorax usually sparse and often faint. Face marks broad irregular stripes filling most of lateral areas, with often a spot on clypeus. Thoracic markings only on tubercles; legs with yellow only at base of tibiæ.

Form MESILLÆ.

Male—Differs from typical form as follows: Upper extension of lateral face marks very short and stout, not curving around antennæ; yellow stripe on scape broader and more conspicuous, (fig. 80). Tegulæ, tarsi, and a large part of tibiæ yellow. Puncturation of thorax more sparse and faint; pits on propodeum more shallow and inconspicuous; first two abdominal segments distinctly punctured.

Female.—Differs from typical form as follows: Lateral face marks well developed, filling lateral areas, and extending to top of antennal sockets; large part of clypeus and often spot on supraclypeal area yellow; two stripes on collar, tegulæ, wing bases, front of fore tibiæ, large part of other tibiæ, and all tarsi bright yellow. Puncturation of head and thorax exceedingly delicate; enclosure of propodeum smooth, not pitted.

Form SANICULÆ.

Male.—Differs from typical form as follows: Scape broader at apex; yellow on face reduced to two narrow, irregular stripes on lateral areas, an irregular stripe on clypeus, and a small spot on supraclypeal area, (fig. 83). No yellow on thorax or legs, except base of hind tibiæ.

Female.—Has no yellow markings except, "a narrow line on each side of face, (sometimes wanting), and base of tibiæ." (Rob. Can. Ent., 28: 137).

Variety MAGNICLAVIS.

Male—Differs from typical form in that upper extension of lateral face marks project straight from lateral areas, then curve around antennal sockets, and end in a large knob; supraclypeal mark longer also, (fig. 77, taken from paratype).

Female.—Indistinguishable from "form mesillæ".

Habitat.—Apparently the whole of North America from Mexico well into Canada, at all altitudes. Recorded on flowers of *Cleome*, *Mentzelia*, *Fragaria*, *Tamarix*, *Mentha*, *Solidago*, *Amorpha*, *Melilotus*, *Grindelia*, *Astragalus*, *Drymocallis*, *Bigelovia*, *Wild Plum*, *Salix*, *Sisymbrium*, and *Clematis*.

Specimens examined: 500–600 males, and 400–500 females, from Calif., Colo., Nev., N. M., Ariz., Neb., Wisc., Mich., Ill., Me., Cana., etc.

The variations in this little species are astounding. I have before me over one thousand specimens from widely separated localities all over the United States, and parts of Canada, including very large series from many of these localities, and among them all sorts of modifications are found. The species is, I believe, the most common in America, as it is most often represented in local lists, and forms a considerable part of most collections. Covering such an area as it does, and being subject to such different conditions, it is only natural that many variations should be found. Extremes of these variations, if taken alone, would be considered distinct species at once, and it is only in an enormous series that the intergradations become evident, and distinctive characters vanish. An idea of the variations in color characters in the species can be obtained from figures 77–83 and 124–129, which indicate a few of the steps from the strongly, clearly marked forms to the poorly marked, or wholly dark ones. To be complete the series should include many more of the intermediate forms, but those given will serve to illustrate the range of variation. In nearly all characters of both sexes a similar degree of variation is found. The puncturation varies all the way from that of the typical form as given, or even more dense, to very faint, indistinct punctures in some specimens. In none, however, is the abdomen densely, coarsely punctured, as it is in some other species; at most the first two or three segments are moderately punctured.

The form *mesillæ* is found mostly in New Mexico, Arizona, and the surrounding States, apparently being a southern form. It can only be distinguished by its color markings,

which are very bright and conspicuous in the extreme specimens, as described, but are not at all constant. Some specimens can be found from practically any locality which lack the marking of one part or another, and the rest which do not vary in this way show every variation from the markings of this, to those of the other forms, so that no definite line of demarcation can be found to distinctly separate it. Specimens from Colorado, and farther north show a gradual, altho irregular change from this form to the others, with longer face marks and more restricted thoracic markings. Some of the northern forms, however, include specimens with yellow on the collars of the females, or other of the markings of the southern form, so that the modification is not determined by locality entirely, but the tendency toward variation is found thruout the entire range.

No particular region seems to favor any one of the other groups in this species, unless it is the variety *magniclavis*, which is only recorded from Nebraska. As only three specimens of this are known in the male sex, however, nothing can be told of its range. I have paratypes of both sexes of this from Mr. Swenk, who originally described it as new. There is nothing to warrant its being kept as distinct, tho, in the light of the preceding facts. The only character to distinguish it is the large upper extension of the lateral face marks in the male, and this is very little different from some of the strongly marked specimens from other localities. In genitalia it is identical with the typical form, and the only ground for separating it as a variety, is that there is not such a complete series connecting it with the typical form, as in the other cases. I have, however, a few specimens that approach it so closely as to make the separation difficult, and undoubtedly when more collecting is done the full series will be obtained. But until this takes place it is well to call it a variety.

The specimen described above as "form *saniculæ*" undoubtedly corresponds to what Robertson took to be a distinct species because it had very irregular, and poorly developed face marks. I think, however, that there can be

no doubt about its being a mere form of *P. cressoni* which is poorly pigmented. In genital, and sculptural characters, as well as size and form, it agrees perfectly with *P. cressoni*, unless a slight modification of the eighth ventral plate is characteristic. In the only specimen at hand this plate has apical lobes that lack the granular appearance of the typical specimens, and are somewhat flattened, (fig. 51), but I think this is very likely due to the individual mount. The face marks of this form are obviously of the same type of those of the typical form, the only difference being that they are incomplete, so in such a variable group as this it would be folly to give it specific rank. This conclusion is made even more certain by the fact that the females are indistinguishable from those of the typical form. I have a complete series of these showing a perfect gradation, or rather showing all the intermediate variations, from this to the more strongly marked forms, and even some in which there is practically no yellow pigmentation whatever. With such series as these to examine there can be no doubt about the specific identity of the various specimens which have been considered distinct.

Aside from the forms given above which can be in some cases distinguished from the typical specimens, are two "species" which can not even be separated as forms. These were described as *P. pasadenæ* Ckll. and *P. labiatifrons* Ckll. Of the former I have specimens determined by Professor Cockerell and a large series from around Pasadena, the type locality, all of which are indistinguishable from the series of typical specimens. As to the identity of the latter I am not so sure, as I have no specimens, but it is indistinguishable by the description, at least. It is described as differing from *P. cressoni* by its larger size, which might indicate *P. rudbeckiæ*, but as Professor Cockerell described this also, I infer not. *P. cressoni* varies so markedly in size that no distinction can be made on this alone, and unless new characters are obtained from the type it will certainly have to remain under *P. cressoni*.

Among the various series of *P. cressoni* I have come upon

a number of interesting freakish specimens, which indicate still more strikingly the tendency of the group as a whole. Probably the most peculiar of these is the female shown in figure 124, which has almost fully formed face marks of the male type. In other respects, such as genitalia, etc., it corresponds perfectly with the other females, but in this it shows a decided resemblance to the males, having considerably more typical face marks than male specimens of the *saniculæ* form. Such modifications as these two, in which a tendency toward the markings of the opposite sex is shown, can only be attributed to variations, and illustrate again the importance of having series of specimens before describing new species on markings alone.

PROSOPIS RUDBECKIÆ Ckll. and Csd. 1895.

1895. *P. rudbeckiæ*, Ckll. and Csd. Trs. Amer. Ent. Soc. 22 : 300.
1896. *P. rudbeckiæ*, race *ruidosensis*, Ckll. Psyche Supp. 7 : 30.
1896. *P. rudbeckiæ*, race *subdigitata*, Ckll. Psyche Supp. 7 : 31.
1896. *P. rudbeckiæ*, Ckll. Psyche Supp. 7 : 31.
1901. *P. rudbeckiæ*, Lov. Ent. News. 12 : 9.

P. rudbeckiæ, form DIGITATUS (Ckll.).

1896. *P. digitatus*, Ckll. Psyche Supp. 7 : 30.
1901. *P. digitatus*, Lov. Ent. News. 12 : 8.
1909. *P. digitatus*, Ckll. Ann. and Mag. Nat. Hist. Ser. VIII. 4 : 27.
1909. *P. digitatus fedorica*, Ckll. Ann. and Mag. Nat. Hist. Ser. VIII. 4 : 27.

P. rudbeckiæ, var. BAKERI (Ckll.).

1896. *P. bakeri* Ckll. Psyche Supp. 7 : 26.
1904. *P. bakeri*, Vier. Can. Ent. 36 : 93.

Typical Male.—Small, averages a trifle larger than *P. cressoni*. Distinguished by long upper processes of lateral face marks, very narrow at base, remote from orbital margin ; by yellow on collar (usually); and by horn-like processes of eighth ventral plate.

Very closely related to *P. cressoni*, which it resembles in form and structure.

Sculpture.—Similar to that of *P. cressoni*.

Yellow Markings.—Lateral face marks broad, filling lateral areas, extending above in a straight, narrow line, following the outline of antennal sockets, remote from orbit, ending in a more or swollen tip,

(fig. 89); scape with irregular stripe in front. Tubercles, anterior tibiæ, and tarsi yellow; two yellow spots on collar, sometimes wanting.

Genitalia.—Armature and seventh ventral plate similar to those of *P. cressoni*, but larger, (figs. 16, 37); eighth ventral plate quite distinct, having the apical pedicel narrow, terminating in two short, membranous lobes, each with a horn-like chitinous rod mesad, (fig. 50).

Female.—Quite similar to same sex of *P. cressoni*, not always distinguishable from that species, but typical forms larger, with considerable yellow on collar and clypeus, (fig. 137).

Form DIGITATUS.

Male.—Similar to typical form, but thorax wholly dark, and upper processes of lateral face marks finger-like, without terminal enlargements; scape dark, not dilated.

Female.—Indistinguishable from typical form.

Variety BAKERI.

Male.—Differs from typical form in having scape swollen, strongly concave exteriorly, the entire front and concave portion being yellow; upper processes of lateral face marks long, narrow at base, following outline of antennal sockets, ending in a large, round swollen apex, (fig. 88 shows the style of lateral face marks, although it is from another form).

Female.—Indistinguishable from typical form.

Habitat.—Apparently not restricted in the United States, I have specimens from Colo., Nev., N. M., Ariz., Calif., Ore., Tex., Alab., N. J., Cana., etc., at various altitudes. Judging from the material at hand, and the records of others, it is probably much more common in the Rocky Mountain States than eastward.

Specimens examined: about 150.

This species is a very near relative of *P. cressoni* which it resembles in both sexes. The females of the two, as is usual with such close allies, are indistinguishable, except in the typical forms. The males, altho usually quite distinct, sometimes resembles those of *P. cressoni* in face marks and have to be separated by genital characters. In color, size and sculpture, this species varies much as does the other, and most of the discussion given under that will apply here. Usually both sexes have yellow on the collar, but numerous specimens lack it. The face marks of the males before me

show much less variation than those of *P. cressoni*, but this is very likely due to the smaller number of specimens. In thoracic and leg markings they vary just as much: many specimens having practically no yellow on collar, tubercles, or tegulæ, which condition is usually accompanied by a reduction to some extent of the face markings, such as the loss of the swollen apices of the lateral face marks. The extreme specimens of this kind I have considered identical with Cockerell's "P. digitatus", and have called "form digitatus" as described above. This was described as a distinct species with a number of varieties, or races, (Ckll. Psyche Supp. 7:30), but undoubtedly they are merely poorly pigmented specimens, corresponding to the form "saniculæ" under *P. cressoni*. The same tendency toward poor pigmentation is found in a number of species, but other characters such as genitalia, sculpture, etc., prove their specific identity with the better colored forms in each case. This is made especially evident from the fact that no two of these specimens agree in the poorly developed marks, some having one part and some another more fully developed. A series illustrating this in the case of *P. cressoni* is shown in figures 81–83. This variability accounts for the various specimens described by Cockerell as races.

Under "variety bakeri" I have included specimens of the type described by Cockerell as *P. bakeri*. A specimen of this in the C. F. Baker collection is very distinctly marked, as described, but other forms show such a tendency toward the markings of this form that specific distinction is unwarranted, especially in such a species as this in which a considerable range of variation in marking is found, and since the genitalia are identical with those of a large series of typical specimens.

The insufficiency of the characters upon which the forms and varieties described as species, *P. bakeri*, *P. digitatus*, *P. ruidosensis*, and *P. rudbeckiæ* race *subdigitatus*, were based, can be seen from the following key given by Cockerell for separating them:

"A. Tubercles wholly black.
1. Wings tinged grayish, mesothorax pubescent...**subdigitata.**
2. Wings tinged brownish, mesothorax bare.....**digitata.**
B. Tubercles partly yellow.
1. Comparatively large, face white, scape wholly white in front. **bakeri.**
2. Face pale yellow, scape with at most a yellow mark.
a. Larger, wings tinged brownish.....**ruidosensis.**
b. Smaller, wings tinged grayish .....**rudbeckiæ."**

Such distinctions, altho perhaps appearing quite final in a small series, are of no value whatever *as specific characters*, in the light of the preceding facts. I have the Baker collection containing the lots from which most of these were described, and have examined types or authentic specimens of all but *digitata*, and they cannot be separated except as forms or varieties as given above.

In addition to the preceding variations there is one in which the modification is in the genital characters instead of face marks. This I have called *P. rudbeckiæ* var. *granulatus* from the granulated appearance of the eighth ventral plate which resembles in this respect that of *P. cressoni*, (fig. 54). This plate is intermediate between that of *cressoni* and *rudbeckiæ*, having the granulated appearance of the former, but with dark chitinized portions suggesting the horn-like projection of the latter. In face markings this resembles var. *bakeri*, but lacks the yellow on the scape, (fig. 88). I have three male specimens of this variety, all agreeing with this description.

PROSOPIS CONSPICUA n. sp.

Male.—Distinguished by its large size, greatly swollen scape, greatly dilated upper extension of lateral face marks, fine dense puncturation of thorax, yellow on collar, tubercles, and tegulæ; and by the long narrow wings of the seventh ventral plate.

Large, about 6–7 mm. in length; scape stout, greatly dilated and flattened; face rather narrow; antennal sockets close together, (fig. 91); clypeus less than one-half as wide at base as at apex, somewhat narrower at base than lateral face marks at same level. Thorax and abdomen stout; propodeum rather short, without any conspicuous superior face.

Sculpture.—Front and vertex conspicuously punctured with moderate sized, round punctures, becoming confluent near antennal sockets;

cheeks shallowly, striate-punctate. Mesoscutum very finely, densely punctate, somewhat granular in appearance; scutellum similarly but more sparsely punctured; metanotum finely rugose. Propodeum lightly sculptured; enclosure small; bowl rather stout, surface not pitted, almost smooth; lateral face and sides almost smooth, microscopically wrinkled; posterior face not bordered by a raised ridge, but rounded off. Mesopleura finely, densely punctured, rather rugulose, like mesonotum; metapleura similar. Abdomen impunctate, dull, not shining.

Yellow Markings.—Lateral face marks very large, filling lateral areas, extending above in a broad projection following orbit, diverging from eye at level of base of antennal sockets, ending in a great rounded, swollen apex, nearly as large as the scape, the two coming quite close together above antennal sockets, (fig. 91). Scape with front entirely yellow; collar, except for small space at center, tubercles and spot on tegulæ yellow. Legs with front of fore tibiæ, base and apex of middle and hind tibiæ, and all tarsi yellow.

Genitalia.—Armature of the same type as that of *P. rudbeckiæ* but much larger, (fig. 15). Seventh ventral plate large, similar to that of *P. rudbeckiæ*, but wings long, with long, narrow basal portion as in *P. varifrons;* the tooth-like processes are short and only extend along about half of the margin, (fig. 44). Eighth ventral plate identical with that of *P. rudbeckiæ*, except in size, (fig. 49).

Female.—Very similar to male in size, form, and sculpture. Scape normal; clypeus unusually narrow at base, being narrower than lateral areas at that level; supraclypeal area very short and broad (fig. 135).

Sculpture.—Practically identical with that of male.

Yellow Markings.—Lateral face marks short, broad, filling most of lateral areas, but not extending above antennal sockets; spot on clypeus usually present. Thoracic markings as in the male. Marks on legs limited to the base of tibiæ.

Habitat.—Ormsby county, Nev., and Santa Clara county, Calif. Type locality the former.

Specimens examined: 150.

This species is nearest related to *P. rudbeckiæ*, but differs very markedly in face marks, proportions of face, position of antennal sockets, size of scape, long wings of seventh ventral plate, etc., as shown above. The 150 specimens from Nev. and Calif. show practically no variation, and are all easily distinguished by the characters mentioned. The peculiar, fine, granular puncturation of the thorax is very characteristic, and not found in any other species. The species is much larger than even the extreme forms of *P.*

rudbeckiæ, and has the most conspicuous yellow markings of all the species. So far it is only known from the localities above mentioned, which are only a short distance apart, so its range would appear to be limited.

PROSOPIS TRIDENTULUS Ckll. 1896.

1896. *P. tridentulus*, Ckll. Psyche Supp. 7 : 27.
1896. *P. tridens*, Ckll. Psyche Supp. 7 : 28.
1898. *P. tridentulus*, Ckll. Ent, 1898, p. 217.
1901. *P. tridentulus*, Lov. Ent. News. 12 : 9.
1903. *P. tridentulus*, Ckll. Psyche. 10 : 74.
1906. *P. tridentulus*, Ckll. Bull. Amer. Mus. Nat. Hist. 22 : 423.

Male.—Distinguished by its large size, heavily punctured abdomen, short, curved, upper extensions of lateral face marks, narrow at tip; and its dark collar.

Rather large, about 7 mm. long, slender. Clypeus short, broad at apex, as broad as long, usually narrowed at base. Supraclypeal area below antennal sockets very long; scape large, swollen, not concave laterad. Metanotum comparatively long, over half the length of scutellum; pronotum large and prominent.

Sculpture.—Front, vertex. and occiput, densely, confluently punctured, punctures extending down on to cheeks. Pronotum heavily punctured; mesonotum densely, almost confluently punctured, punctures smaller than on vertex; scutum similarly but more sparsely punctured; metanotum rugoso-punctate, almost pitted. Posterior face of propodeum small, not bordered by a ridge, rounded above; bowl of enclosure long, broad, base and sides with elongate, subquadrate pits; neck of enclosure narrow; lateral areas of posterior face, and sides shallowly, confluently punctured. Mesopleura shining, densely punctured, punctures about same as on mesoscutum; metapleura striate. Abdomen heavily punctured; first segment shining, punctures wide apart; second segment much more densely punctured, especially at base, punctures about size of those of mesoscutum; apical segments with more shallow, larger, and more coarse punctures; punctures on all segments more heavy laterad, and sparse, large and shallow on venter.

Yellow Makings.—Supraclypeal mark very long, extending well above antennal sockets; lateral face marks short, upper processes small, inner margin following outline of antennal sockets, usually confluent with them; outer margin leaving orbit on level with base of antennal sockets, curving gradually around to narrow apex; labrum and mandibles with yellow spots, (fig. 86). Tubercles and usually spots on tegulæ yellow. Legs with front of fore tibiæ, basal half of middle and hind tibæ, and basitarsi yellow.

Genitalia.—Armature very large and stout; cardo unusually long and heavy, narrowing to a rounded tip; stipes stout, superior lobe small, not curving in abruptly at distal end, only extending about one-third the length of stipes; apical portion stout, rounded, heavily haired; sagittal rods not peculiar, reaching to end of stipites; volsella normal, (fig. 18). Seventh ventral plate with triangular wings, outer margin of each somewhat concave; no distinct lobes basally or apically; tooth-like processes very long, slender, and curved; membranous flap typical of the group, (fig. 43). Eighth ventral plate very distinct from preceding species; distal pedicel rather long, ending in two lobe-like flaps, sparsely haired, (fig. 46). When viewed laterally this plate shows a rounded notch near apex, (fig. 47). A similar notch is found in the species *rudbeckiæ*, etc., but is not so conspicuous.

Female.—Not known, or indistinguishable; probably one of the forms that have not yet been associated with their males.

Habitat.—Not very well known; the Baker collection includes specimens from Colo., N. M., Calif. and Cana.

Specimens examined: 12 males. The description is based upon a specimen (probably cotype) sent by Professor Cockerell from Colorado.

This is a very distinct, well marked species, both in external and in genital characters. It is nearest related to the following, but quite unlike it in many respects. In punctuation it greatly resembles *P. episcopalis* Ckll., but is entirely different in other characters. From the small series at hand there appears to be little variation in the species, but more material may prove the contrary. The only variation noticeable, aside from size, is in the basal width of the clypeus, which varies from the typical, (fig. 86), to forms in which it is about one and a half times the width of the lateral area.

P. tridens Ckll. unquestionably belongs to this species if the description given for it is characteristic. The differences were given as being somewhat more dense puncturation of the first abdominal segment, 1 mm. difference in length, and other equally variable characters. I have the lots from which these were described and find only the one species. Five of these have been dissected and are identical in genitalia, as described.

PROSOPIS GROSSICORNIS Swk. and Ckll. 1910.

1910. *P. grossicornis*, Swk. and Ckll. Ent. News. 21 : 67.

Male.—Distinguished by its small size, impunctate abdomen, faintly punctured head and thorax, and face marks resembling those of *P. tridentulus*. Small, about 4½ mm., resembling *P. cressoni* in size, form and puncturation.

Sculpture.—Very sparse and light on head and thorax, resembling in this respect, forms of *P. cressoni;* enclosure of propodeum often smooth.

Yellow Markings.—Face marks almost identical with those of *P. tridentulus*, except in size, and as follows: Supraclypeal mark seldom extending above antennal sockets; clypeus always broad at base; scape normally with a yellow stripe in front; and labrum and mandibles dark. Thorax without markings. Legs with most of tibiæ and tarsi yellow, except median third of middle and hind tibiæ.

Genitalia.—Armature almost identical with that of *P. cressoni*, and *P. rudebeckiæ*, not at all like that of *P. tridentulus*. Ventral plates very similar to those of *P. tridentulus*, except in size, and in the distal pedicel of eighth being shorter, (figs. 19, 42, 48).

Female.—Unknown or indistinguishable.

Habitat.—Not well known. Specimens at hand are from Neb., Wisc., Alab. and Cana. Type locality Lincoln, Neb., May 14, 1901. Taken on flowers of Tamarix gallica (L. Bruner).

Specimens examined: Type, loaned by Swenk, and six specimens in the Baker collection. The description is based upon the type, except for the genitalia, which are from the others.

This little species is very interesting in being related to *P. cressoni* so closely in size, form, puncturation, and genital armature, and to *P. tridentulus* in markings and ventral plates. The seven specimens are practically identical in sculpture and markings, and the genitalia show no variation whatever. Only one specimen shows much variation in marks; this lacks the yellow on scape, and has less clearly cut face marks, (fig. 84) and (fig. 87).

It is not improbable that the insect described by Cockerell as *P. digitata fedorica*, (1909 Ann. and Mag. Nat. Hist. Ser. VIII, 4 : 27) belongs to this species, as the description would indicate: in which case the name would have to be changed to *P. fedorica* Ckll., but not having any authentic specimens of the latter I am not prepared to make the change.

PROSOPIS VARIFRONS Cr. 1869.

1869. *P. varifrons*, Cr. (female). Proc. Bos. Soc. Nat. Hist. 12:270.
1869. *P. varifrons*, Cr. (male). Proc. Bos. Soc. Nat. Hist. 12:271.
1890. *P. varifrons*, Ashm. Bull. Colo. Biol. Assn. 1:21.
1895. *P. varifrons*, Slosson. Ent. News. 6:5.
1899. *P. varifrons*, Birk. Ent News. 10:244.
1901. *P. varifrons*, Ckll. Psyche. 9:283.
1901. *P. varifrons*, Lov. Ent. News. 12:9.
1903. *P. varifrons*, Ckll. Psyche. 10:74.
1806. *P. varifrons*, Ckll. Bull. Amer. Mus. Nat Hist. 22:423
1906. *P. antennata*, Ckll. Bull. Amer. Mus. Nat. Hist. 22;423.
1910. *P. varifrons*, Lov. Psyche. 18:184.

Male.—Known by large, swollen scape, truncate lateral face marks, with projection over antennal sockets; black collar; and distinct genitalia.

Length about 5–6 mm. Head normal; face rather long; scape greatly swollen; clypeus short, broad; supraclypeal area longer than broad below antennal sockets, which are very close together. Metanotum very short.

Sculpture.—Head and thorax heavily punctured. Front, vertex and occiput heavily, confluently, punctured, punctures extending somewhat down on to cheeks. Mesonotum closely, almost confluently punctured, with rather small punctures; scutellum confluently, almost rugosely punctured; metanotum rugulose. Bowl of enclosure of propodeum small, not clearly defined; it and surrounding area at base rugosely pitted, with rather small, subquadrate pits; neck narrow, forming a groove; lateral areas of posterior face, and sides rugulose. Mesopleura densely punctured, with medium sized, round punctures; metapleura somewhat striate, rugose. Abdomen practically impunctate.

Yellow Markings.—Lateral face marks stout, filling lateral areas, truncate just above upper level of antennal sockets, with projection following outline of socket part way along upper border; supraclypeal mark long, extending in a narrow process up between antennal sockets, (fig. 85). Yellow stripe on front of scape; spot on tubercles, front of fore tibiæ, base of middle and hind tibiæ, and basitarsi yellow.

Genitalia.—Not closely resembling any other species. Armature similar to that of *P. tridentulus* in having large cardo and heavy stipites, with small superior lobe curving in abruptly, and rather densely haired apical portion, (fig. 17). Seventh ventral plate with long, pointed wings; the basal lobe being unusually long, narrow, and hairless; outer margin notched at a point about two-thirds of the way toward apex; with a tuft of fine hairs on the knob-like projection, and a fringe of long, narrow, tooth-like processes from there to apex; membraneous flap transparent, slightly haired at tip, (fig. 41). Eighth

ventral plate unlike that of any other species; apical lobes not well separated, merely broad, thin, extensions of the pedicel with a few spine-like hairs apically, (fig. 45).

Female.—Distinguished by its comparatively large size, dark collar, narrow lateral marks on face, heavily punctured head and thorax, and impunctate abdomen with glossy first segment. Somewhat larger than the male which it resembles in general structure.

Sculpture.—Practically the same as that of the male, but more sparse punctures on thorax.

Yellow Makings.—Face marks limited to narrow stripe on each side of face, usually not extending above antennal sockets, (fig. 130). Spots on tubercles, and sometimes on tegulæ, and spots at base of tibiæ yellow.

Habitat.—Apparently not restricted, but found in greater numbers in the Rocky Mountain States. Probably 90 per cent. of the specimens have been taken in Colo., N. M. and surrounding States. It has been found, however, in the eastern States and in Canada. Recorded on *Scrophularia*, *Cratægus*, *Lappula*, *Cleome*, *Linum*, *Dasiphora*, *Pentstemon*, and *Phacelia*.

Specimens examined: about forty, from Colo., N. M., and Canada.

This species is very well marked, and clearly differentiated from all others: it has no near relatives, but probably most resembles *P. tridentulus* Ckll. The eighth ventral plate is entirely distinct, being of a different form than the others, but is nearest to that of *P. tridentulus*, as is the armature. So far as known there is little variation in this species, especially in the males, of which there are over thirty in the collection at hand. The females closely resembles forms of *P. episcopalis* Ckll., but the variation is in the latter species. I think it highly probable that *P. elliptica* Kirby, (1837), is the same as this, but until some authentic descriptions, or specimens can be obtained the older name will have to be ignored.

THE MODESTUS DIVISION.

This division is characterized in the males by the short, simple, truncate, distal pedicel of the eighth ventral plate, lacking apical lobes and pubescence; by the simple, hairy wings of the seventh ventral plate, without tooth-like projec-

tions, and without a basal lobe produced by an invagination; and by the confluent, comparatively narrow upper extensions of lateral face marks.

The four species, with their varieties, included herein, form the most compact, nearly related group in the genus, but one in which the greatest range of variation is found within a species. Apparently the entire division is composed of offshoots from the *modestus* stock, for this species seems to be breaking up into an endless number of forms. Thruout the division the gradual evolution is apparent in genital, as well as external characters, and consequently less emphasis can be laid upon these in classification.

PROSOPIS MODESTUS Say. 1837.

1837. *Hylæus modestus*, Say. Bos. Jour. Nat. Hist. 4:392.
1859. *H modestus*, LeConte. Writ. Thom. Say. Ent. 2:771
1887. *Prosopis modestus*, Cr. Syn. Hymen. N. Amer., 1887, p. 291.
1890. *P. modestus*, Ashm. Bull. Colo. Biol. Assn. 1:31.
1895. *P. modestus*, Rob. Tr. Am. Ent. Soc. 22:116.
1896. *P. modestus*, Rob. Can. Ent. 28:136.
1898. *P. modestus*, Ckll. Ent., 1898, p. 216.
1901. *P. modestus*, Lov. Ent. News. 12:5, 162.
1901. *P modestus*, Rob. Ent. News. 12:78.
1904. *P. modestus*, Rob. Can. Ent. 36:273.
1909. *P. modestus*, Lov. Ent. News. 20:413.
1910. *P. modestus*, Lov. Psyche. 17:182.
Syn. *P. sparsa* Cr.
1869. *P sparsa*, Cr. Proc. Bos. Soc. Nat. Hist. 21:271.
1901. *P. sparsa*, Lov. Ent. News. 12:8.
Syn. *P. flammipes* Rob.
1893. *P. flammipes*, Rob. Tr. Amer. Ent. Soc. 20:273.
1901. *P flammipes*, Lov. Ent. News. 12:7.
Syn. *P floridiana* Rob.
1893. *P. floridiana*, Rob. Tr. Amer. Ent. Soc. 20:273.
1901. *P floridiana*, Lov. Ent. News. 12:7.
Syn. *P pennsylvanica* Ckll.
1896. *P. pennsylvanica*, Ckll. Psyche. 7:439.
1901. *P. pennsylvanica*, Lov. Ent. News. 12:8.
Syn. *P. citrinifrons* Ckll.
1896. *P. citrinifrons*, Ckll. Psyche Supp. 7:27.
1901. *P. citrinifrons*, Lov. Ent. News. 12:8.
1904. *P. citrinifrons*, Vier. Can. Ent. 36:93.
Syn. *P. triangularis* Ckll.

1896. *P. triangularis*, Ckll. Psyche Supp. 7:31.
1901. *P. triangularis*, Lov. Ent. News. 12:8.
Syn. *P. sayi* Rob.
1904. *P. sayi*, Rob. Can. Ent. 36:274, 5.
Syn. *P. eulophi*, Rob.
1905. *P. eulophi*, Rob. Can. Ent. 37:236.
Syn. *P. supracurta* Swk. and Ckll.
1910. *P. supracurta*, Swk. and Ckll. Ent. News. 21:71.

P. modestus var. MINYRA, (Lov.).

1909. *P. minyra*, Lov. Ent, News. 20:413.

P. modestus var. ILLINOIENSIS (Rob.)

1896. *P. illinoiensis*, Rob. Can. Ent. 28:138.
1897. *P. illinoiensis*, Rob. Tr. Ac. Sc. St. Louis. 7:315.
1901. *P. illinoiensis*, Lov. Ent. News. 12:7.
1904. *P. illinoiensis*, Rob. Can. Ent. 36:274, 5.
1910. *P. illinoiensis*, Lov. Psyche. 12:182.

Typical Male.—Recognized by its rather broad face, short lateral marks, which are truncate, or narrow to tip a short distance above antennal sockets; and impunctate, or delicately punctured abdomen; together with the genitalia.

Rather stout; head broad; scape moderately stout, not conspicuously excavated on outer side; face broad, not narrowing suddenly below; clypeus stout, but space between clypeus and eye at narrowest point comparatively broad, not narrow; base of clypeus about equal to width of lateral areas at same level.

Sculpture.—Front and vertex thickly punctured with small, irregular, confluent punctures; striate laterad. Mesonotum thickly punctured with medium sized, round punctures, separated by about one-half the diameter of one puncture; scutellum with considerably larger, more separated punctures; metanotum rugose, about one-half the length of the scutellum. Enclosure of propodeum funnel shaped on posterior face, rapidly broadening on superior face, and covered with long, subquadrate pits on lateral portion; sides rugose dorsad, rugulose ventrad; lateral areas almost smooth. Mesopleura moderately, shallowly punctured; punctures about the size of those on mesoscutum, but less close; metapleura depressed, striate dorsad, rugose ventrad. First abdominal segment glabrous, with very few fine punctures; remaining segments impunctate.

Yellow Makings.—Lateral face marks stout, not narrowing to mere stripes below, but filling lateral areas, and remaining stout to lower end, (fig. 93); above narrowing to tip on eye margin somewhat above antennal sockets; supraclypeal mark quadrate, not extending above antennal sockets. Tubercles and spot on each side of collar yellow.

Anterior tibiæ in front basal third of middle and hind tibiæ, and basitarsi yellow ; remaining tarsi brown.

Genitalia.—Armature rather stout ; cardo short, broadly rounded at apex ; stipes stout, superior lobe not abrupt but rounding at distal end, rather short ; apical portion stout, rounded, with long hairs ; sagittal rods appearing narrow from above when in their normal position, ending about even with stipites ; volsella comparatively small, (fig. 12). Eighth ventral plate short, simple, hairless ; basal piece normal ; distal pedicel short, truncate, slightly broadened at apex, (fig. 25). Seventh ventral plate stout ; wings short, pointed at apex, without membranous flap ; basal lobe prominent, almost as large as remainder of wing ; apical portion with few long hairs, especially near tip ; extremity of basal lobe with a tuft of short hairs, (fig. 69).

Typical Female.—Rather large, about 6 mm. long ; stout, face broad ; lateral areas below comparatively broad, as in the male ; supraclypeal area below antennal sockets twice as broad as long, much broader than lateral areas at same level ; scape long narrow.

Sculpture.—Similar in general to that of male. Occiput almost smooth ; mesoscutum with quite small punctures ; mesopleura with small sparse punctures, separated by twice the diameter of one puncture. Abdomen impunctate ; first segment polished. Otherwise as in male.

Yellow Markings.—Lateral areas of face each with a broad, short irregular blotch, extending from level of antennal socket down almost to the narrowest point of the lateral area, not touching eyes or clypeus, (fig. 136). Tubercles, two lines on collar, and base of tibiæ yellow.

Var. MINYRA (Lov.).

Male.—Differs from the typical form in being very small, only about 4 mm. in length, and in having long upper extensions of lateral face marks of almost uniform width, (fig. 100).

Var. ILLINOIENSIS (Rob.).

Male.—Differs from typical form in having face marks not pointed on eye margin, but slightly separated at apex, and often stouter.

Habitat.—Practically all of North America except the Pacific coast.

Specimens examined : about 250. Localities include Wisc., Me., Ind., Pa., Mass., Mich., Ill., Neb., Colo., Tex., Va. and Queb. Males dissected : about 30. Plants recorded as visited by this species : *Aralia*, *Solidago*, *Rubus*, and *Eupatorium*.

This is an exceedingly variable species in size, markings, sculpture, and somewhat in genitalia. Some specimens from Texas, a number from Wisconsin, and a few from other

localities are very small, about the size of *P. cressoni*. The largest specimens are from Canada, both males and females but the size does not depend especially upon the locality, for there are a number of very small Canadian specimens as well as large southern ones. In face marks the males vary greatly; some having the typical lateral marks remaining broad to the upper edge of the antennal sockets and then tapering off as in figure (98); others ending almost abruptly on a level with the antennal sockets as in figures (93–95); while still others have longer, less tapering marks as in figures (96, 99, 100); and between all of these are all sorts of intermediates, some of which are shown in the series of figures (93–100). There is no uniformity whatever in these variations, either according to the size of the specimen, the locality in which it was taken, or any other distinguishable factor. There is simply an exceedingly strong tendency to vary thruout the entire species, and series from practically any locality will show almost any of the modifications. In thoracic markings also, there is no regularity; often the collar is entirely black; usually the tegulæ and wing bases are black, and the tibiæ and tarsi may have almost any amount of yellow from a mere spot on each tibia to entirely yellow tibiæ and tarsi both. In some specimens the labrum and mandibles are yellow as in *P. ziziæ*, but as a rule they are dark. In puncturation the same sort of variation is found, within certain limits; the punctures of the head and thorax are considerably more dense in some specimens than in others; and the basal segments of the abdomen vary from absolutely smooth to quite conspicuously, altho sparsely, punctured. Upon none of the above characters can distinct separation be based, because they are entirely untrustworthy.

In this species far more than in any other is there a tendency toward variation in the genitalia. The only place in which this is exhibited clearly is in the seventh ventral plate, for the eighth is so simple as to allow of almost none. In the former a series of variations is found including all forms intermediate between the two most extreme ones shown in figures (69 and 72), the former having very broad, short,

stout, wings, with the basal lobe larger than the apical portion, and the latter with long, narrow apices, and basal lobes extending backward, rather than at right angles to the remainder. All such forms as are shown in figures (69 to 72), under *modestus* and *episcopalis* are represented in the series of dissections I have made of *modestus* alone. No connection can be made, however, between the shape of these plates and the shape of the face marks, for specimens agreeing in face marks may have all the various forms of ventral plates, or vice versa. Likewise there is no connection between the shape of these and the range of the specimen, any more than with the markings. Nothing whatever can be distinguished to connect any of the variously modified specimens into groups that can be said to have any reliable diagnostic characters to warrant specific separation, or even good varietal separation. It is necessary, however, that some sort of division be made to distinguish as far as possible the two or three most extreme modifications, and I have indicated these as varieties, altho it is very doubtful whether they should be called more than forms.

The characters of the female are even more variable than those of the male. The above description is of a typical Indiana specimen, but does not by any means hold true for all. The face marks are usually larger than those illustrated, covering the entire lateral areas, or at least all below the base of the supraclypeal area. In some specimens, however, the marks are much more reduced than those figured, being mere irregular strips. Only very seldom do the marks become so prominent as to include any of the clypeus, altho in an occasional specimen spots will be found on it. In thoracic markings and puncturation the same variations occur as in the males. And as in the males also, there is no regularity, or uniformity in the variations, so that no distinct division can be made. There are over 125 specimens in my material, from all parts of the range given above, and yet it is impossible to separate this series into any definite groups that can be of use.

Under the heading *P. modestus* I have provisionally placed eleven forms previously described as species. Eight of these were described from males, and three from females, as follows:

P. sparsa, female, described in 1869 by Cresson, as differing from *affinis* Sm. by, "punctures of head and thorax being much more sparse, and by the subquadrate head": otherwise agreeing with the description of a typical female of *P. modestus*. The species that has been called *affinis* in this country does not differ from *modestus* in the female enough to be easily distinguished, and in all probability the specimen described by Cresson is *modestus*, as this species is by far the more common one. At any rate it is certainly one of the two, according to the description, and comes in this group, because the characters given above cannot be of any value in diagnosis. It is also noticeable in this, as in most of the other synonyms mentioned, that there is no record of the "species" since it was first described, as no one could recognize it.

P. flammipes, female, was described in 1893 by Robertson, from a Florida specimen. The description fits that of *modestus*, except for the "first and base of second segments of abdomen rufous", which character is of no value unless supported by others. Many specimens are found that have various amounts of reddish color on the basal abdominal segments, without regard to species. If the rufous tinge is constant and accompanied by other characters the specimen mentioned may represent a distinct species, but no indication of this is given, and there is every reason to believe that it is only one of the forms of *P. modestus*. No one but Robertson, apparently, has ever recognized it.

P. floridana, female, was described by Robertson in 1893, also from Florida. It was distinguished from *P. affinis* Sm. "by somewhat smaller size, clearer wings, paler ornaments, by having spots on face more elongate, and hind tarsi whitish at base". There is absolutely nothing in this to distinguish it from *modestus*, so this is the only place for it, at least until further characters are given.

P. pennsylvanica, male, described by Cockerell from Pennsylvania specimens, agrees perfectly as far as the description goes, with the form of *modestus* having the lateral face marks only slightly notched by the antennal sockets, and receding to a point on the orbital margin. Cockerell says of this, "it looks most like *modestus* at a glance, but differs in the shape of the face marks". The shape of the face marks, however, correspond to the form mentioned, so that no distinction of this nature can warrant specific separation. I have examined a specimen of this in the Cockerell collection, and found nothing to distinguish it from *modestus*.

P. citrinifrons, male, was described by Cockerell in 1896, from Colorado specimens. This also agrees with the description of *modestus* as given, except in the "prothorax dark, except yellow on tubercles". I have the Baker collection containing the lot from which the type of this was taken, and find in it several specimens without yellow on the collar, but they are merely forms as indicated. Dr. Howard writes that the species is known only by its unique type in the National Museum, which would indicate that the specimen is only one of those lacking the collar markings.

P. triangularis, male, was also described in 1896 by Cockerell, from Georgia specimens. The description is very complete in external characters, but gives nothing to distinguish the specimens from a form of *modestus*, having narrowed upper lateral face marks. The description stated, "it might be confounded with *affinis*, but is larger, the supraclypeal mark is much longer, and the wings are darker". The size, supraclypeal mark, and shade of wings are of *no value*, and nothing else is given that could distinguish the specimen. What Professor Cockerell probably took for *affinis* at that time was a form of *modestus*, for his description of the face marks could not possible indicate *P. ziziæ* which has usually been taken for *affinis*.

P. sayi, male, was described in 1904, by Robertson, from Illinois specimens. The only distinction given between this form and that called *illinoiensis*, is that it has the lateral face marks pointed on the eye margin and tegulæ often with yel-

low. Robertson says concerning it, " according to my separation of them *P. illinoiensis* sometimes has a dot on the tegula, and *P. sayi* often has ". Obviously such a distinction is worthless. I have examined specimens supposedly of this, identified by Cockerell, Swenk, and others, no two of which agree, and all of which are only forms of *modestus*.

P. eulophi, male and female, described by Robertson in 1905, from Illinois specimens, is indistinguishable by the description. This cannot be placed definitely until the types are examined. The description states, " face narrowed nearly one-half below,—face below antennæ whitish, on eye margin pointed as high as middle of scape ", etc. I have provisionally included this here because the rest of the description of the male, and the description of the female agree with *modestus*, and as far as can be told from the statement about the markings they also agree.

P. supracurta, male, was described by Swk. and Ckll. in 1910, from a Colorado specimen. The description states, " very similar to the same sex of *P. sayi* Rob. but basal abdominal segment more strongly punctured,—may prove to be only a subspecies of that form ". I have before me the type of this from Mr. Swenk, and find it indistinguishable except as one in the series of forms. The face of the specimen is shown in figure 96.

P. modestus var. MINYRA, (Lov.).

This form was described as a distinct species from Virginia specimens. The extreme specimens are distinguished by being very small, and having long upper extensions of lateral marks as described. Only the extreme individuals, however, can be distinguished from the ordinary ones and this in a purely arbitrary manner. Along with specimens of this are found every variation in size and markings between it and the others. In a series from Wisconsin containing a number of these small specimens the intergradation is shown perfectly, many of the smallest having shorter, tapering lateral marks, or even marks that are almost truncate at the level of the antennal socket; and other specimens of much larger size have the long marks well formed; in genitalia they show

the same range as any other series of the species. This variety, like the var. *magniclavis* under *P. cressoni*, is one in which the yellow markings are strongly emphasized, but otherwise it is like the small specimens of the other forms.

P. modestus var. ILLINOIENSIS, (Rob.).

Robertson described this as a distinct species having the face marks somewhat club shaped laterally, instead of narrowing on eye margin as in *sayi*. Robertson did not recognize *P. modestus* at that time, and described this and *sayi*, to include what had been called *modestus*. There is a large amount of material of this general description in the series of *modestus*, at hand, including a number that have been identified as *P. illinoiensis* Rob. but it merely composes part of the group as discussed above. The form "*P. sayi*" of Robertson is the typical *modestus*, and "*P. illinoiensis*", includes those having the stout, or slightly club shaped lateral marks. This division is purely arbitrary, and will not, as Robertson himself indicated, serve to separate any but the individuals which happen to be so marked. Nevertheless it is useful for this, and very serviceable in separating large lots into general groups.

In all the above forms the main characteristics distinguishing *modestus* are found. That is, the impunctate or very sparsely punctured abdomen, the comparatively broad face, and stout scape of the males serve to distinguish them from the other species having similar genitalia. The relationship between them and some of the following, however, is very close, as will be seen.

Whether or not the species now known as *modestus* is the same as the original species described as such by Say, is a debatable question. The types are no longer in existence and very little can be determined from the original description, but for many reasons it seems advisable to retain the name, now so long and widely used; especially since it is applied only to this one species and can cause no confusion. This question is discussed more in detail by Mr. Lovell (Psyche. 10:182, 3), whose conclusion I have adopted.

PROSOPIS ZIZIÆ Rob. 1896.

1896. *P. affinis*, Rob. Can. Ent. 28 : 136.
1896. *P. ziziæ*, Rob. Can. Ent. 28 : 136.
1898. *P. ziziæ*, Ckll. Ent. 31 : 187.
1898. *P. ziziæ*, race *dunningi*, (male), Ckll. Ent. 31 : 188.
1901. *P. affinis*, Lov. Ent. News. 12 : 6.
1901. *P. ziziæ*, Lov. Ent. News. 12 : 162.
1904. *P. ziziæ*, Rob. Can. Ent. 36 : 274.
1909. *P. ziziæ*, Lov. Ent. News. 20 : 414.
1910. *P. ziziæ*, Lov. Psyche. 17 : 181.

Male.—Resembles male of *P. modestus* in size and form, may be distinguished by the long, heavy upper processes of the lateral face marks, the slender, curved scape, usually with a yellow stripe, and by the different genitalia.

Scape swollen, rather slender, concave laterad and caudad ; clypeus rather long, narrower at base than lateral areas at same level.

Sculpture.—Not appreciably different from that of *P. modestus*.

Yellow Markings.—Lateral face marks heavy, filling lateral areas and extending one-half the length of scape along eye margin, not narrowing but rather broadening to rounded or truncate apex ; supraclypeal mark rather long, portion below antennal sockets quadrate ; scape usually with yellow stripe in front ; labrum and mandibles usually with yellow, (fig. 101). Collar, tubercles, sometimes tegulæ and wing bases with yellow. Legs marked as in *modestus*.

Genitalia.—Similar to those of *P. modestus*, except the seventh ventral plate, which has broad, somewhat triangular, but rounded wings, without distinct lobes, and largely covered with long hairs, but without the basal tuft found in related species, (figs. 11, 26, 29).

Female.—Only typical specimens are distinguishable from the same sex of *P. modestus*, and these only by the larger lateral face marks, which almost fill the lateral areas and extend some distance along the eye margin as shown in figure (No. 138); and by the yellow on tegulæ and wing bases.

P. ziziæ var. DUNNINGI (Ckll.).

This form was described as *P. ziziæ* race *dunningi*, by Cockerell, from South Dakota specimens, but has since been separated as a species. Professor Cockerell's first determination, however, is undoubtedly the correct one. I have specimens from Colorado and Nebraska, the latter determined by Swenk, who has for some time worked in conjunction with Professor Cockerell, and they are unquestionably *ziziæ*. The characters distinguishing it from the typical form are :

"lateral face marks broadened and squarely truncate at ends", (fig. 102), and quite strongly punctured first abdominal segment, (not always true). The seventh ventral plate, at least in some specimens is broader than usual, (fig. 30).

Habitat.—About the same as that of *P. modestus.*

Specimens examined: About 60. Localities represented: Ill., Mass., Me., Kans., N. J., La. and Queb. Recorded on flowers of *Solidago*, *cultivated raspberry*, *cultivated blackberry*, *Castanea*, *Lomatium*, *Rubus*, *Symphoricarpus*, and *Melilotus.*

The males of this species are usually very distinct and easily recognized by their face marks; and can always be distinguished by the characters of the seventh ventral plate. Some specimens lack the yellow stripe on the scape, and many are without yellow on the tegulæ and labrum. Apparently the variation is less in this species than in *P. modestus*, but a much larger series will have to be obtained before this can be established. In range it is not distinct from *P. modestus*, as some writers have thought, but coincides with it, so far as can be judged from the present data.

In the female sex separation is much more difficult than among the males, in fact it is only the well marked, typical forms that can be separated with any certainty at all. I have specimens taken at the same time and place with typical males, but which are indistinguishable from specimens of *P. modestus.* Probably many of those included under the latter belong to this species, but as the other is the more variable species in the males I have placed the questionable ones under it. Unless some new characters are discovered for differentiation these will have to remain as intermediates.

PROSOPIS EPISCOPALIS Ckll. 1896.

1896. *P. episcopalis*, Ckll. Psyche Supp. 7:29.
1901. *P. episcopalis*, Lov. Ent. News. 12:8.
Syn. *P. universitatis*, Ckll.
1906. *P. universitatis*, Ckll. Ann. and Mag. Nat. Hist. Ser. VII. 17:225.

P. episcopalis var. SUBTRISTIS (Swk. and Ckll.).

1910. *P. subtristis*, Swk. and Ckll. Ent. News. 21:70.

P. episcopalis var. COQUILLETTII (Ckll.).

1896. *P. coquillettii*, Ckll. Psyche. 7:439.
1901. *P. coquillettii*, Lov. Ent. News. 12:8.
1903. *P coquillettii*, Ckll. Psyche. 10:74.

Male.—Typical specimen easily known by the face marks, the yellow on scape, and the coarsely, shallowly, heavily punctured dorsum of abdomen.

Rather long, slender, about 6–7 mm. in length. Face long, narrow, not strongly convergent below; scape moderate, concave exteriorly; clypeus long, 2½–3 times as long as broad at base; supraclypeal area below antennal sockets quadrate. Apex of first abdominal segment with usually a white fringe of pubescence.

Sculpture.—Front, vertex, and occiput with dense, confluent, but not rugose puncturation, becoming shallower and striate on cheeks. Mesoscutum closely punctured with medium sized, clear cut, round punctures, somewhat smaller than those of head; scutellum with larger, more separated punctures; metanotum rugose. Propodeum normal in shape and sculpture; bowl of enclosure with large, subquadrate, shallow pits; lateral areas rugose to rugulose. Mesopleura rather heavily punctured, with punctures larger than those of the scutum, separated by about one-half the diameter of one puncture; metapleura rugose, striate. First segment of abdomen smooth, conspicuously punctured with small punctures, separated by two to three times the diameter of one puncture; segment two similarly but more densely punctured; segment three and those following with punctures becoming much larger, more shallow and not so clear cut, but heavy, coarse, and very conspicuous; apices of segment two and following noticeably raised; punctures of all segments more dense laterad, and more sparse and shallow on venter.

Yellow Markings.—Face marks somewhat similar to those of *P. ziziæ*, but narrower, and upper extension of lateral marks shorter and narrower, (fig. 103). Scape with yellow stripe in front; labrum and mandibles with yellow spots. A strip on each side of collar, tubercles, and tegulæ yellow. Legs with front of fore tibiæ, base and apex of other tibiæ, and basitarsi yellow; apical tarsi brownish.

Genitalia.—Practically identical with those of *P. modestus*, (figs. 13, 27, 73).

Female.—Typical specimen distinguished by the long lateral face marks, long clypeus, and abdomen punctured as in the male.

Resembles male in general form and sculpture; face long; clypeus barely broader at base than lateral areas at same level; narrowest space between clypeus and eye relatively broad; scape as in other females, long and narrow, (fig. 139).

Sculpture.—Practically identical with that of male in typical form.

Yellow Markings.—Face marks filling lateral areas, extending short

distance above antennal sockets, narrowing to eye margin. Thoracic markings as in the male. Legs with very small spot at base of each tibia, remainder black.

P. episcopalis var. SUBTRISTIS (Swk. and Ckll.).

Male.—Differs from typical specimens only in having no yellow on scape, collar, or tegulæ, and very little on tubercles, and having less on labrum, mandibles and legs.

Female.—Differs from typical form in having variable, smaller, face marks, no yellow on collar, tegulæ, or legs, except base of hind tibiæ, and in having more sparse punctures on abdomen. The extremes of this are very large, rather stout, black forms, quite similar to females of *P. varifrons*, (fig. 132).

P. episcopalis var. COQUILLETTII (Ckll.).

Male.—Differs from typical *episcopalis* in having long lateral face marks, extending almost to top of orbit, (fig. 104), almost entirely yellow fore and hind tibiæ and tarsi, coarsely, confluently punctured abdomen, and smaller size.

Female.—Abdomen almost impunctate; pleura heavily punctured; markings like those of typical form. Almost indistinguishable from same sex of *P. ziziæ*, (fig. 139).

Habitat.—So far as known the Western, and Southern States.

Specimens examined about 100, from Colo., N. M., Nev., Calif., and Tex. Recorded on flowers of *Pentstemon*, *Symphoricarpus*, *Malvastrum*, and *Drymocallis*. Altitude records range from 1000–8000 feet.

This species apparently supplants *modestus* and *ziziæ* in the extreme Western States, and partly on the east slope of the Rocky Mountains. Like the eastern species to which it is nearly related it is quite variable in a number of characters. The greatest difference between this and the eastern species is its coarsely, shallowly punctured abdominal segments, and the noticeably raised apices of these segments. These characters are uniform in the series of fifty males before me, except in the variety *coquillettii*, which can be distinguished in other ways. The face markings of the male are quite constant thruout, but the thoracic markings show a wide variation. Present material falls into two groups on these characters; eleven specimens from Colorado agreeing with the typical form, and thirty odd specimens, nearly all from Ormsby county, Nevada, differing as follows: Somewhat

variable, but all having dark collars, and usually more restricted yellow markings on legs and thorax. These I have designated "var. *subtristis*."

Of the females thirteen specimens from Colorado and California agree in general with the description of the typical form, except that they vary considerably in size, while about thirty specimens, mainly from Nevada have almost no yellow on legs or thorax, and very reduced face marks, and have no yellow on the collar. These, corresponding to the dark male form, are designated "var. *subtristis*." They are exceedingly variable in size, form and markings, as well as puncturation of abdomen, some having almost no punctures except on second or third segments and very few here. The varietal name is taken from the form of which the female was described by Swenk and Cockerell as *P. subtristis* (Ent. News. 21:70). I have a paratype of this from Mr. Swenk, which is identical with the series of Nevada specimens, being merely one of those with the almost impunctate abdomens. The most extreme of these specimens cannot be distinguished from females of *P. varifrons*, Cr. This group of females, like that including *modestus*, and *ziziæ*, or that containing *coloradensis*, *wootoni*, etc., is very homogeneous and variable, and only typical specimens can be determined with certainty.

The variety *coquillettii* is based upon the description of *P. coquillettii* Ckll., (Psyche. 7:439), and upon two male specimens from Texas agreeing with this description. Cockerell's specimen was from California, but none of my specimens from this region correspond to it. The two males from Texas, however, are certainly identical with it if the description is accurate. They are easily recognized as a variety, but have no characters to warrant their separation as a species, being merely a better pigmented form such as may be found in southern groups of many species. The description of the female of this variety is based upon two specimens from the same place as the males. I have provisionally put them here, altho they could be equally well put with the *modestus* group, on account of their small size and almost impunctate abdomen.

P. ænigmus Vier. so far as can be told by the description, (Insects of Beulah, New Mexico), certainly belongs to *P. episcopalis*. It is described as differing by, "disc of metathorax rugose, with no large, shining pits as in *episcopalis*", which character is utterly valueless for separation. Similarly *P. universitatis* Ckll. is only differentiated upon minor differences in the face marks, shade of flagellum, and black collar (Ann. and Mag. Nat. Hist. Ser. VIII, 17:225). This is probably the variety *subtristis*.

PROSOPIS FOSSATA n. sp.

Male.—Easily distinguished by its large size, coarse, confluent puncturation over head and thorax, fossa and grooves of propodeum, long narrow basal segment of abdomen, and entirely dark collar.

Length about 6–7 mm. Slender; scape moderate, concave laterad; flagellum very long, light beneath; face long, narrow; clypeus less than half as broad at base as at apex, equal in width to lateral areas at base; thorax slender, flattened; propodeum long; posterior face not clearly outlined; abdomen slender, first segment almost conical.

Sculpture.—Practically entire body except abdomen, coarsely, rugosely, confluently punctured. Front, vertex and occiput with confluent, rugose, striate punctures, extending down onto cheeks. Pronotum confluently punctured over entire surface; mesoscutum coarsely, confluently punctured, almost rugose over entire surface; scutellum similar but disc more sparsely punctured; metanotum rugose, almost pitted. Enclosure of propodeum abnormal; entire bowl on superior face, lateral margins not curved but straight, in form of ridges, converging to a large, deep fossa which takes the place of the usual neck; bowl entirely covered with irregular pits; laterad of the apex of the bowl are deep, irregular grooves, or excavations, running into the fossa, below which are more irregular, very deep pits extending over the posterior face and onto the sides of the propodeum; the margin of the posterior face is bordered by a high, sharp, irregular ridge except at top of fossa where it arches over. Mesopleura with large, deep, irregular, confluent punctures, almost pit-like, varying in size and shape and separated by sharp ridges; metapleura depressed ventrad, short, broadened above, margins becoming indistinct among the coarse punctures. Abdomen absolutely impunctate, first segment glossy, and rufous, remainder dull black.

Yellow Markings.—Face marks strongly resembling those of *P. episcopalis*, (fig. 105), but lack yellow on labrum and mandibles. The only thoracic marks are spots on the tubercles. Legs with front of fore tibiæ, base and apex of other tibiæ, and all tarsi yellow.

Genitalia.—Very similar to *P. modestus* and *episcopalis*, but armature longer and heavier, especially stipites, (figs. 14, 28).

Female.—Recognized by its coarse puncturation, large, long, lateral face marks, yellow on collar, and impunctate abdomen with red basal segment. Slightly larger than the male which it resembles in form.

Sculpture.—Puncturation as in the male, exceedingly coarse and heavy thruout. Propodeum lacking the fossa of the male, but coarsely pitted at base ; neck of enclosure narrow forming a groove. Abdomen as in the male.

Yellow Markings.—Very conspicuous, lateral face marks filling lateral areas and extending well above base of antennæ, terminating abruptly on eye margin. Entire collar except small space in center, tubercles, spot on tegulæ, front of fore tibiæ, base of middle tibiæ, practically all of hind tibiæ, and all tarsi yellow.

Habitat.—Unique male type from Louisiana, in collection of C. F. Baker, (No. 2336). Unique female from Alabama, in collection of C. F. Baker. (No. 2296). No other data given.

There is no chance for confusing this with any other species known to me. The coarse, dense, pit-like punctures over entire head and thorax, with the immense, deep fossa of the propodeum of the male, the great pits and ridges of its lateral surface, and the comparatively narrow, V-shaped enclosure entirely on the superior face, are found in none of the other species, and serve to distinguish it at a glance. The species described by Robertson as *P. nelumbonis* may possibly be the same as this if the red basal segment of the abdomen is characteristic, as this is the distinguishing feature given for that species. However, as there was nothing else given in the description to indicate relationship there is no way of deciding until Robertson's specimens are redescribed. So far as I know no description of the male of *P. nelumbonis* has been given, altho it has been mentioned in print. If Robertson had specimens of this species it is almost inconceivable that some of the sculptural characters should not have been mentioned, so there is little possibility of the two being the same.

THE ASININUS DIVISION.

The genital characters separating this from the other divisions are based principally on the seventh ventral plate, which is of an entirely distinct form. The wings of this plate as a rule have a broad, more or less quadrate body, invagi-

nated on the outer margin near base, forming a narrow lobe. At or near the apex of the wing is some form of a membranous flap, (differing in the different species), which usually extends beyond the body. No pubescence is found on the plate except a slight amount on the basal lobe; and there are no tooth-like projections whatever on the outer margin. The eighth ventral plate always has apical lobes, but never the horn-like processes of the Cressoni Division. The genital armatures have no uniform characters to separate them from those of the other groups; but usually they are more slender and delicate than the others.

The face markings of this division are of two types; one in which the lateral marks are very large, and broaden out above the antennal sockets, as in *asininus;* and the other in which the face is broad above, and narrowed suddenly below, causing the lateral marks to diverge suddenly, or at least noticeably, above the level of the antennal sockets, as in *P. wootoni.* The group is not so compact as either of the other two in markings or genitalia. Three species (*nevadensis*, *cookii* n. sp. and *calvus* n. sp.) are included here which are quite different from the rest and from each other, in genitalia, but their relationship is shown without question in other characters. All of the species in this division are comparatively small, and are apparently found only in the Western States, where some become quite abundant.

PROSOPIS ASININUS Ckll. and Csd. 1895.

1895. *P. asininus*, (male), Ckll. and Csd. Tr. Amer. Ent. Soc. 22 : 299.

1895. *P. bipes.* (female), Ckll. and Csd. Tr. Amer. Ent. Soc. 22 : 300.

1896. *P asininus*, Ckll. Psyche Supp. 7 : 30.

1898. *P asininus*. Ckll. Ent., 1898, p. 217.

Male.—Small species; distinguished by its long, narrow face, with long large lateral marks, and by its heavily punctured abdomen.

Length about 5 mm.

Sculpture.—Punctures of front, vertex, and occiput enormous for the size of the insect, confluent, almost pit-like in places, becoming sparse on cheeks. Those of mesoscutum large, rather close, but not confluent; of scutellum similar but a trifle larger and more sparse; metanotum very short, one-third the length of scutellum; with few large,

round punctures, not rugose. Enclosure of propodeum broad; neck narrow; bowl almost entirely covered with broad, shallow, subquadrate pits; laterad of bowl a rounded, pitted area extends down on the side; remainder of propodeum rugulose. Mesopleura with large, round punctures, separated by less than diameter of one puncture; metapleura rugose striate. Dorsum of abdomen almost uniformly punctured, at least first four segments, with round punctures about half as large as those on mesoscutum; separated by about twice the diameter of one puncture; on sides and venter becoming more sparse.

Yellow Markings.—Supraclypeal mark long; lateral marks confluent with orbit, extending above the insertion of antennæ about the length of scape, and broadening above it; spot on labrum variable. An unbroken line on collar; spots on tubercles, tegulæ, and wing bases yellow. Anterior tibiæ in front; middle and hind tibiæ entirely, except ring near apex, and all tarsi yellow, (fig. 109).

Scape dark, short, broad in front, somewhat flattened (in the figure it is directed upward, appearing abnormally short). Supraclypeal area below insertion of antennæ almost quadrate; clypeus at base slightly narrower than lateral areas at same level.

Genitalia.—Both the armature and the ventral plates are very similar to those of *P. coloradensis* and *P. polifolii*, as shown in the figures, (figs. 23, 55, 67) (see also description under *P. coloradensis*). The membranous flap of each wing of the seventh ventral plate is peculiar in shape, being somewhat ear-like, and finely lined as shown. The location and shape of this distinguishes the species at a glance.

Female.—Larger than the male. About 6 mm. long. In punctuation it is very similar to the male except that the punctures of mesoscutum are more dense, and those of pleura more sparse, while those of the abdomen are much smaller and more sparse. The yellow markings resemble those of the male, except on face and legs. The only marks on the face are two long lateral marks which resemble the lateral marks of the male, except that they do not broaden much above antennal sockets, and are truncate instead of tapering at apex. Base of clypeus almost one and one-half times as broad as lateral areas at same level. Tibiæ with less yellow than those of male, and tarsi except basitarsi black.

Habitat.—So far as known only Arizona and New Mexico. Male and female types from Las Cruces, N. M., "on campus of Agricultural College. Sept. 1894". Recorded on flowers of *Mesquite*, *Solidago*, *Biglovia* and *Fallugia* during May and June.

Six males and three females in the collection represent the above localities. In these there seems to be no variation whatever in general characters. The yellow marking of face and thorax, including the unbroken yellow line on collar, are constant in all. Apparently this is a species showing little

variation, but not enough material has been obtained to ascertain this with certainty. In both sexes the posterior face of the propodeum is cut squarely off as if with a knife, making a sharp angle above and on sides.

PROSOPIS MEGALOTIS Swk. and Ckll. 1910.

1910. *P. megalotis*, (male and female) Swk. and Ckll. Ent. News. 21: 69.

This species is very nearly related to *P. asininus* Ckll. the description of which will apply here except in a few particulars. In the male the external difference is mainly in the larger size, broader face, with heavier, more truncate lateral marks; and in the large amount of yellow on the labrum and mandibles as shown, (fig. 108). The ventral plates of the male, are considerably different from those of *asininus*, however, being like those of *coloradensis* and *polifolii* in lacking the peculiar ear-like flaps. The females of the two species differ in merely secondary characters; the lateral face marks being shorter and the yellow on collar being broken in the center. In both sexes the mesoscutum is more densely punctured, with smaller punctures than in *asininus*, and the propodeum lacks the sharp angle above: the surface being rounded instead of cut off abruptly, (figs. 108, 119).

Habitat.—Nebraska; Colorado; types of both sexes from "Glen, Sioux Co., Neb. Aug. 17, 1906; on *Cleome serrulata* (M. H. Swenk)". In coll. Univ. Neb.

Mr. Swenk records fifty specimens, all but one from Nebraska. Found on *Cleome* and *Solidago*, in August.

This species is a very near relative of *P. asininus* and may prove to be a variety of that when more material is obtained. Two paratypes from Mr. Swenk have been examined, which differ from *asininus* as shown above; in them the distinguishing characters are quite plain, but what will be found in an adequate series cannot be foretold.

PROSOPIS COOKII n. sp.

Male.—Very small; related to *P. asininus* Ckll. but much smaller, with face broader above, lateral marks shorter, and very different genitalia.

Length 3½–4 mm. Slender; posterior face of propodeum cut off

abruptly, slightly concave, with sharp ridge on lateral and superior borders as in *asininus*. Scape short, stout, but not swollen; posterior side concave, flagellum normal; clypeus long, broad at apex, almost touching eyes, making apices of lateral face marks very narrow and pointed below; face rather broad, narrowed rapidly below.

Sculpture.—Head, thorax, and abdomen heavily punctured. Front, vertex, and occiput with immense, confluent punctures, like those of *asininus*, continuing quite heavy down on to cheeks. Mesoscutum with large, round, deep punctures, smaller than those of front, separated by less than the diameter of one puncture, usually very much less; scutellum similarly but more sparsely punctured; metanotum narrow, roughened. Propodeum similar to that of *asininus* but pits smaller. Mesopleura mainly punctured like mesoscutum, but becoming rugulose dorsad and cephalad; metapleura rugose striate. Abdomen coarsely punctured, first segment similarly to mesoscutum, but punctures slightly smaller and more separated; punctures on remaining segments still smaller, but quite dense.

Yellow Markings.—Face marks clear cut, distinct; supraclypeal mark extending above antennal sockets, longer than broad; lateral marks very narrow at apex of clypeus, filling lateral areas, following outline of antennal sockets, broadening slightly above, then tapering off evenly to tip on eye margin, about two-thirds the length of scape above antennal sockets. Base of clypeus slightly narrower than lateral marks at same level. Yellow on collar broken in center; tubercles, tegulæ, and wing bases with yellow spots. Anterior tibiæ in front, middle and hind tibiæ, except a subapical ring, and all tarsi yellow, (fig. 111).

Genitalia.—Armature similar to that of *P. asininus*; seventh ventral plate without any membranous attachments; each wing being pointed at tip, broadening medially, and lobed at base; lobe short and sparsely pubescent, (fig. 60). Eighth ventral plate similar to that of *P. asininus*, but short and stout, (fig. 68).

Female.—Very small, with dense puncturation similar to that of male, except on abdomen where the punctures are small, fine and close on all but basal segment. Differs from female of *P. cressoni* in puncturation, yellow on collar, and face marks; from female of *P. wootoni* by its very small size, heavy, large punctures, especially on head and pleura, and in the short, narrow lateral face marks, (fig. 116).

Habitat.—Type of male from Filmore Cañyon, Colo., Aug. 27, (Coll. Cockerell). Female from White Mountains, N. M. (Coll. Townsend, in Cockerell Collection).

The unique male type of this species is marked "*P. asininus* var." by Professor Cockerell, but is quite distinct from

that species; differing as it does in size, proportions of face, and genitalia. In its face it is intermediate between the broad face of *wootoni* and the very narrow one of *asininus*; the lateral marks are intermediate between these two in length, being longer than those of *wootoni*, but not extending so far along eye margin as in *asininus*. The base of the clypeus is considerably narrower than in *wootoni*, and the lateral marks are broader above, and not irregular in outline, (fig. 111). The female can only be confused with that of *P. asininus* or of *wootoni*, and in a series may intergrade with the former. The specimen described is easily recognized by its small size, and yellow markings which are not large and conspicuous on either head or thorax. This and the nearly related females may be separated from those of the small species of the Cressoni Division by the heavy, coarse punctures of the head extending on to occiput, and by the heavier punctures of the thorax.

PROSOPIS COLORADENSIS Ckll. 1896.

1896. *P. coloradensis* (male), Ckll. Psyche Supp. 7:30.
1906. *P. tuertonis*, (female). Ckll. Bull. Amer. Mus. Nat. Hist. 22:423.
1907. *P. coloradensis*, Ckll. Uni. Colo. Studies. 4:240.

Male.—Small; easily told by its peculiar broad face; short lateral marks and very narrow supraclypeal mark. Antennal sockets very close together; supraclypeal area below antennal sockets much longer than broad.

Length about 5.5 mm. Scape short, dark, punctured, as in *asininus*.

Sculpture.—Front, vertex, and occiput with large, confluent punctures, becoming sparse on cheeks. Mesonotum densely punctured with medium sized punctures, smaller than on head, separated by only about one-half the diameter of one puncture; scutellum similarly but not so densely punctured; metanotum rugose, almost pitted. Enclosure of propodeum normal in shape, entire bowl pitted irregularly; lateral space on each side of enclosure pitted, as in *asininus;* remainder of propodeum rugose. Mesopleura rather heavily punctured, almost confluent cephalad, and becoming striate dorsad; metapleura longitudinally striate. Dorsum of first three or four segments of abdomen distinctly punctured with smaller and more sparse punctures than those of mesoscutum, becoming more sparse ventrad, and almost lacking on apical segments.

Yellow Markings.—The face marks are clear cut, (fig. 107); lateral

marks exceedingly broad, filling lateral areas but not broadening above insertion of antennæ as in the preceding species, extend about half the length of scape above antennal sockets, uniform in width, ending almost abruptly; clypeus about 2.5 times as broad at apex as at base, and only two-thirds as wide at base as lateral areas at that level; supraclypeal mark long and narrow, not extending above antennal sockets; yellow on collar restricted to a narrow spot on each side. Tegulæ, tubercles and wing bases with more or less yellow. Anterior tibiæ in front, base and apex of middle and hind tibiæ, and all basitarsi yellow; other tarsi brownish.

Genitalia.—Armature rather slender; cardo quite short and broad; stipes with broad superior lobe and slender apex, hairy; sagittal rods normal, (fig. 21). Seventh ventral plate without teeth, largely membranous; wings broad, hairless except for narrow small lobe, (fig. 58). Eighth ventral plate long; basal part normal; distal pedicel rather narrow, ending in two flap-like apical lobes covered with long hair, (fig. 64).

Female.—Larger than male, but puncturation similar in general; occiput almost impunctate, and abdomen usually quite impunctate. Face broad; lateral marks very narrow, short stripes, (fig. 117); thoracic markings small and inconspicuous; legs dark, except base of hind tibiæ.

Habitat.—Rocky Mountain States, and westward; specimens in the collection represent Colo., Wyo., Nev., Calif., Neb., S. D. and N. M. Type locality, Chambers Lake, Colo. 9500 feet. Recorded on *Solïdago* and *Cleome.* Nine male, and ten female specimens examined. I have taken this species in the foot-hills of the Big Horn Mts. in Wyoming at about 4000 feet; F. S. Bichowsky has taken it in King's River Cañyon, Calif., at 8000 feet; and Townsend has taken it in the White Mts., N. M. at 6600 feet.

The few specimens at hand show comparatively little variation in the male, except in puncturation of the abdomen; in some specimens the entire dorsum is heavily punctured, while the original description of the male states, "first segment of abdomen minutely but distinctly and rather closely punctured", so evidently that is the typical form. Altitude has apparently no effect on the puncturation for specimens from 4000 and 8000 feet are alike in this respect. Among the female specimens there is considerable variation; the lateral face marks being very irregular in some, but always

short and narrow. Between the typical females of this and *P. wootoni* there is apparently more or less intergradation, making absolute distinction impossible in some cases; in general, however, separation can be made as stated.

PROSOPIS CALVUS n. sp.

Male.—Small species; nearest to *coloradensis*, but differs in the narrower face, short, narrow, lateral face marks, and entirely different genitalia.

Length about 5 mm.; slender; posterior face of propodeum small, not cut off squarely, but rounded above; scape short, stout, similar to that of *coloradensis;* flagellum normal, light beneath; clypeus long, narrow at base, about two-thirds the width of the lateral areas at same level; surpraclypeal area below antennal sockets longer than broad.

Sculpture.—Head, thorax, and abdomen heavily punctured with large punctures, becoming faint on cheeks. Mesoscutum heavily punctured with medium sized punctures, considerably smaller than on front, separated by less than the diameter of one puncture; scutellum with much larger, more sparse punctures; metanotum over half as long as scutellum, rugulose. Enclosure of propodeum broad above; neck narrow; entire bowl shallowly pitted; small areas laterad of bowl also pitted; lateral areas of posterior face punctured; sides rugulose. Mesopleura more sparsely punctured than mesoscutum, but punctures of same size; metapleura striate. First two segments of abdomen heavily punctured, with medium sized, round punctures, separated by about the diameter of one puncture; remaining segments very sparsely punctured.

Yellow Markings.—Face marks extending very little above antennal sockets, (fig. 110); supraclypeal mark not extending between antennal sockets; lateral marks broad, short, filling lateral areas, but ending almost abruptly at upper level of sockets. Collar with a small yellow spot on each side; tubercles with yellow spots; other thoracic marks lacking. Legs with anterior tibiæ in front, basal third of middle and hind tibiæ, and basitarsi yellow; other tarsi brown.

Genitalia.—Armature short, stout; stipes heavy, with large superior lobe, and stout, rounded, heavily haired apical portion; sagittæ extending beyond stipites; volsella very large, lateral lobes almost round, inner lobes very small, (fig. 20). Seventh ventral plate entirely nude; wings largely membranous, long, narrow; each with a large transparent flap on outer side; chitinous portion of proximal arms unite before they reach the extension of the wings, in a broad curve, instead of close to the wings as in other species, (fig. 59). Eighth ventral plate short, stout, hairless; distal pedicel short, stout, ending in two long, narrow divergent lobes, without pubescence, (fig. 63).

Female.—Unknown.

Habitat.—Santa Clara County, Calif. (coll. C. F. Baker). Type locality only one known for the species.

This is a peculiar species in many respects; resembling in face marks the males of *P. coloradensis*, but face much less broadened, and lateral marks not extending up along eye margin above insertion of antennæ, and not so broad. The upper portions of the marks are not clear cut and in a series will probably prove somewhat variable, altho in the specimens known they are alike. Similarly the thoracic markings, not being conspicuous, will probably be variable. In characters of the male genitalia this species shows no close relationship to any others; the armature in the broad superior lobe of the stipes resembles *P. cressoni*, but is otherwise quite different; in ventral plates it stands alone in having these completely nude, altho the general shape of the seventh ventral plate is quite like that of *P. cressoni*, but without any tooth-like projections. The eighth ventral plate differs strikingly from all others in the form and position of the apical lobes. Owing to the delicate membranes of the seventh ventral plate its exact structure is difficult to determine, and the accompanying figure may be somewhat incorrect in details, but the general form and appearance is unmistakable

PROSOPIS WOOTONI Ckll. 1896.

1896. *P. wootoni*, Ckll. Psyche Supp. 7:26.
1896. *P. divergens*, Ckll. Psyche Supp. 7:29.
1898. *P. wootoni*, Ckll. Ent., 1898, p. 217.
1901. *P. divergens*, Lov. Ent. News. 12:8.
1903. *P. clandestinus*, Vier. Insects, Beulah, N. M.
1904. *P. divergens*, Vier. Can. Ent. 36:93.
1906. *P. divergens*, Ckll. Bull. Amer. Mus. Nat. Hist. 22:423.
1910. *P. excavata*, (female), Swk. and Ckll. Ent. News. 21:70.

Male.—Small; distinguished by short, tapering lateral marks; and broad base of clypeus, which is about the same width as lateral marks at that level.

Length about 5 mm. Scape short, heavy, entirely dark, flattened, slightly concave behind.

Sculpture.—Front, vertex and occiput densely, confluently punctured; punctures as in *asininus* but not so pit-like. Punctures of thorax similar in general to that of *P. coloradensis*, but pleura quite sparsely punctured and pits of propodeum small, resembling rugæ.

Posterior face of propodeum quite small; borders rounded, without raised ridge. Punctures of abdomen usually sparse; first segment finely, sparsely punctured; the punctures small and separated by about six times the diameter of one puncture; remaining segments practically impunctate.

Yellow Markings.—Lateral marks short, not reaching more than about one-third the length of scape above antennal sockets, but narrow (much more so than in *coloradensis*), and tapering to a point; supraclypeal mark usually broader than long, (figs. 112–113). Except for dark tegulæ and wing bases the markings of the thorax are the same as in *P. coloradensis*. Legs with front of fore tibiæ, basal third of middle and hind tibiæ, and basal portion of tarsi yellow.

Genitalia.—Resemble those of *coloradensis* but are much smaller, apices of stipites rounded and heavy, instead of tapering; basal lobes less pronounced. Seventh ventral plate does not differ from that of *P. coloradensis* except in size, (Fig. 56). Eighth ventral plate differs only in being smaller and somewhat stouter, (fig. 66).

Female.—Resembles the male in size and puncturation. Abdomen finely but usually closely punctured; occiput usually almost impunctate. Lateral face marks fill lateral areas below base of clypeus, from which they slant off gradually above to tip somewhat above antennal sockets, (fig. 118). Legs black, except spots at base of tibiæ; thoracic markings as in male.

Habitat.—Rocky Mountain States. Type locality, "Ruidoso Creek, N. M., 7000 feet, taken on *Scrophularia*, July. (E. O. Wooton)".

Specimens examined: 68, representing N. M., Ariz., Colo., Wyo., Nev., Ore. Taken at altitudes ranging from 4000 to 8000 feet, from June to August.

This is a very variable species in both sexes. The abdominal puncturation varies from that of the typical form with only the first segment distinctly punctured, to others with almost the entire dorsum punctured. A series of forty specimens from Ormsby County, Nev. collected by C. F. Baker almost all have yellow on the tegulæ in both sexes, and have heavily punctured abdomens. In some the lateral face marks are broader above the antennæ than in the typical form, and end almost abruptly (fig. 113), but between this and the typical form are all variations. Seven specimens from Sheridan, Wyo. are about midway between the two above forms in puncturation, and markings. They have just

moderate puncturation on the abdomen; are larger than the new Mexican specimens but smaller than the Nevada specimens, and have yellow on the tegulæ. A male from Oregon has a very small supraclypeal mark, poorly formed lateral marks, and very heavily punctured abdomen. One from Colorado has very well formed, complete face marks like the Nevada specimens, but sparsely punctured abdomen. A male from Canada has very poorly developed face marks, dark tegulæ, and a very sparsely punctured abdomen. In all of these the variation is so irregular that no line can be drawn separating even varieties.

The description of *P. clandestinus* Vier. corresponds almost exactly to that of the New Mexican specimens of *P. wootoni* in the collection, there being no characters which could in any way distinguish the two. Viereck's specimens were from the same locality as these and I have no doubt that they are identical. At least they will have to be considered so until further characters are given.

P. divergens Ckll. is described as differing from *P. wootoni*, "by its smaller size, white face, and spots on tegulæ", but cannot be distinguished by these characters. I have specimens of this from Colo. and N. M. determined by Cockerell, as well as the Baker collection from which it was described, and all are indistinguishable in external or genital characters from *wootoni*.

P. excavata Swk. and Ckll. is only one of the series of variable female specimens in this species; the slight excavation in the face marks is merely an incidental variation in pigmentation, often found in several species. I have examined the type of this and compared it with the series mentioned above, in which it is indistinguishable, (fig. 120).

PROSOPIS POLIFOLII Ckll. 1901.

1901. *P. polifolii*, Ckll. Can. Ent. 33: 281.
1905. *P. polifolii*, Ckll. Psyche. 10:74.
1910. *P. polifolii*, Ckll. Ann. and Mag. Nat. Hist. Ser. VIII, 5:29.

Male.—Small; most easily distinguished by absence of supraclypeal mark, and by long lateral face marks. In general features it is quite similar to *P. wootoni*.

Sculpture.—Head, thorax and abdomen very heavily, densely punctured. Front, vertex, and occiput heavily, confluently punctured; punctures running into striæ on cheeks. Mesoscutum entirely covered with crowded, almost confluent punctures, somewhat smaller than those of head; scutellum densely punctured with somewhat larger punctures; metanotum about half as long as scutellum, rugose. Enclosure of propodeum normal, clearly defined, irregularly pitted on superior face; remainder finely rugulose; rest of propodeum ranging from coarsely rugulose laterad of bowl of enclosure to finely rugulose on lateral areas of posterior face. Mesopleura punctured similarly, and almost as densely as mesoscutum; metapleura rugose, not conspicuously striate. Dorsum of first three abdominal segments heavily punctured with round, clear cut punctures about the size of those on mesoscutum, separated by about one-fourth the diameter of one puncture; remaining segments distinctly, but more lightly punctured.

Yellow Markings.—Face marks only on clypeus and lateral areas, the supraclypeal area being dark; clypeal mark broader at base than lateral marks at that level; lateral marks long, not following outline of antennal sockets, but slanting off from slightly above base of clypeus, gradually narrowing to truncate tips at about one-third the length of scape above the sockets. Stripe on each side of collar, tubercles, and often tegulæ and wing bases yellow. Front of fore tibiæ, basal third of middle and hind tibiæ, and basitarsi yellow, (figs. 112, 113).

Genitalia.—Armature indistinguishable from that of *P. asininus* or *P. wootoni*. Seventh ventral plate differs from that of the other two only by the long, narrow basal lobe, (fig. 57). Eighth ventral plate differs from that of *coloradensis* only in its smaller size, (fig. 65).

Female.—Indistinguishable from that of *P. wootoni* (fig., 122).

Habitat.—California. Especially common in Southern California, being by far the most common species in this region.

Specimens examined: About 150.

This species is very nearly related to *P. wootoni*, being perhaps only a variety of that. The lateral face marks of the male vary considerably in a series: sometimes the lateral marks fill all the space in the lateral areas, but usually they are more poorly developed than in the specimen figured. Often there is considerable dark space between the lateral marks and the clypeal mark, in which case the upper extensions of the lateral marks are usually pointed and narrow. In some specimens the lower and lateral portions of the clypeus are dark. In no specimens is there any yellow on the supra-

clypeal area. The tegulæ may or may not have yellow. The affinity of this species is undoubtedly with *P. wootoni*, from which it is only distinguished by the dark supraclypeus and the long basal lobes of the seventh ventral plate. Apparently, however, these characters are constant in all specimens. The variations in the markings of the female are not as noticeable as in the male, but in this as in the other sex the lateral marks are always long. Occasionally a specimen is found with a yellow spot on the clypeus, but never very conspicuous. This sex can only be separated from *P. wootoni* females by locality, which is not at all certain.

PROSOPIS NEVADENSIS Ckll. 1896.

1896. *P. nevadensis*, Ckll. Psyche Supp. 7 : 32.
1898. *P. nevadensis*, Ckll. Ent., 1898, p, 185.
1910. *P. hesperiphila*, Ckll. Ann. and Mag. Nat. Hist. Ser. VIII. 5 : 29.

Male.—Small ; very similar to *P. polifolii* Ckll., but can be distinguished by its broader face, short broad lateral face marks, and very different genitalia.

About 5 mm. long. Face broad above, narrowing suddenly below ; clypeus narrower at base than lateral areas at same level, and about twice as broad at apex as at base. Antennæ and general structure as in *polifolii*.

Sculpture. Punctures of head, thorax, and abdomen dense and heavy as in *polifolii*.

Yellow Markings.—Lateral face marks broad, filling lateral areas, following antennal sockets for about one-fourth their circumference ; truncate at about the level of top of antennal sockets, with a slight projection at eye margin, (fig. 115). Collar, tubercles, tegulæ, and wing bases normally with yellow.

Genitalia.—Armature short, stout ; cardo rather short ; stipes stout ; superior lobe extending half-way to apex ; apical portion stout, tapering at tip, rather heavily haired ; volsella large, especially lateral lobe ; sagittal rods equal in length to stipites, (fig. 22). Seventh ventral plate unlike that of any other species. Each wing is rather long, uniform in width thruout, curving out gradually at base where it is rounded, without any basal lobe ; basal portion sparsely covered with rather long delicate hairs ; apex of each wing a membranous flap extending outward or forward, (fig. 61). Eighth ventral plate short, stout ; distal pedicel stout, ending in two apical lobes, pubescent at tips, (fig. 62).

Female.—Similar to same sex of *P. polifolii*, but has short lateral face marks, (fig. 121).

Habitat.—So far as known, Nevada and California. California specimens taken in King's River Cañyon at 7000–8000 feet (F. S. Bichowsky).

Specimens examined: About 20.

This species is peculiar in being evidently so nearly related to *P. polifolii* and yet having such different male genitalia. In some of the males are found traces of a supraclypeal mark as small yellow blotches. As in *polifolii* there is often more or less black between the lateral and clypeal marks, and also at apex of clypeus. The membranous flaps of the seventh ventral plate do not always point out as shown in the figure, but may point somewhat forward, giving a narrowed appearance to the wings. All the males examined are readily separated from those of *P. polifolii* by the short lateral face marks, and the two females from King's River are separated in the same way, but whether this will serve in a large series from many localities is doubtful. The real diagnostic characters are in the male genitalia which can be told at a glance. No previous description of the female has been given, to my knowledge.

P. hesperiphila Ckll. described in 1910 from California specimens is undoubtedly this species, if the description is characteristic. It was based upon the characters of the lateral face marks, which are, "truncate above, and strongly notched by antennal sockets". I have examined the type of this and cannot distinguish it from California specimens of *nevadensis*.

UNCERTAIN SPECIES.

Prosopis affinis Sm. 1853.

1853. *P. affinis*, Sm. Cat. Hym. Brit. Mus. 1:24.
1910. *P. affinis*, (female), Lov. Psyche. 17:179.

No one has yet been able to definitely identify specimens in America as belonging to this species. That usually taken for it has been *P. ziziæ* Rob., but Lovell has shown this to be erroneous in his recent description of the type, (Psyche. 17:179). He considered the two sexes described as *affinis* to belong to different species, and calls that of the male "*P. binghami* n. sp.". From the description and figures given,

however, I can see no reason for this separation, as there are no characters to indicate a radical difference; in fact both sexes so strongly resemble *P. modestus* that it is quite probable they are this species. At least they cannot be definitety determined without an examination of the male genitalia.

Prosopis confluens Sm. 1853.

1853. *P. confluens*, (female), Sm. Cat. Hym. Brit. Mus. 1:24.

Only a very brief general description is given of the female of this species, from which it is unrecognizable.

Prosopis suffusa Ckll. 1896.

1896. *P. suffusa*, (male), Ckll. Psyche Supp. 7:32.

From the description this is evidently one of the "Asininus Division", probably *P. wootoni*, or very nearly related to it.

Prosopis georgica Ckll. 1896.

1896. *P. georgica*, (male), Ckll. Psyche. 7:438.

This is characterized by its, "small size, converging orbits, yellow face, and largely yellow scape". The lateral marks terminate, "broadly on orbital margin"; abdomen impunctate. I have been unable to recognize this.

Prosopis rugosulus Ckll. 1896.

1896. *P. rugosulus*, (male), Ckll. Psyche Supp. 7:28.

The punctured abdomen of this species would indicate a relationship with *episcopalis*, as would also the face marks with, "lateral extensions—ending, about on level with middle of scape in a broad truncation". I have the lot from which this was described, but can find only *episcopalis* in it. Dr. Howard writes that this species is known in the National Museum only by its unique type, and I know of no other specimen.

Prosopis verticalis Cr. 1869.

1869. *P. verticalis*, (male), Cr. Proc. Bos. Soc. Nat. Hist. 12:271.
1909. *P. verticalis*, (female), Lov. Ent. News. 20;413.
1910. *P. verticalis*, Lov. Psyche. 17:184.

Apparently this is related to *P. rudbeckiæ*, and may be the same species. "The stripe on each side of face curves inwardly just above the insertion of antennæ, and ends in a

smooth, polished, rounded space—not seen in any other species". The description is too indefinite to make accurate determination possible, and I have never examined any authentic specimens, so cannot locate it, altho I presume it belongs in the "Cressoni Division."

Prosopis nelumbonis Rob. 1890.

1890. *P. nelumbonis*, (female), Rob. Tr. Amer. Ent., Soc. 17:318.
1904. *P. nelumbonis*, Rob. Can. Ent. 36:273.

The very brief description of the female differs from that of *P. modestus* in giving, "head and thorax coarsely punctured with coarse, shallow punctures—abdomen with first and base of second segments rufous". It cannot be definitely distinguished by these characters alone. The male has been referred to as also having the basal segment of the abdomen rufous, but to my knowledge it has never been described.

Prosopis nucleolus Vier.

P. nucleolus, (female), Vier. Insects of Beulah, N. M. p. 64.

I have been unable to identify this from the description of the female. It cannot be recognized until the male is described.

Prosopis schwarzii Ckll. 1896.

1896. *P. schwarzii*, (female), Ckll. Ent. Mag. 32:218.
1898. *P. schwarzii*, (male), Ckll. Ent. 1898, p. 216.

This is apparently a distinct species, being large, with coarse thoracic puncturation; and lacking the supraclypeal mark in the male. A male specimen in Professor Cockerell's collection lacks the supraclypeal mark, has only a yellow blotch on clypeus, and has short lateral marks, confluent with the orbit. It is evidently of the "Modestus Division", but cannot be located with certainty until the male genitalia are examined.

Prosopis thaspii Rob. 1898.

1898. *P. thaspii*, Rob. Tr. Ac. Sc. St. Louis. 8:43.
1904. *P. thaspii*, Rob. Can. Ent. 36:273.

Both sexes of this species are characterized by having a lateral tooth on front coxa, according to the description.

Otherwise there is nothing to distinguish it from other species. I have never seen a specimen of Prosopis with this character.

Prosopis telepora Lov. 1911.

1911. *P. telepora*, (female and male) Lov. Ent. News. 22:213.

The description of this species would indicate that it is very closely allied to *P. cressoni*, if not that species. The characters given correspond to those of the form of *cressoni* having very narrow upper processes of lateral face marks.

Prosopis melitina Lov. 1911.

1911. *P. melitina*, (female) Lov. Ent. News. 22:214.

The description is of the female only, and might indicate any of several species. Evidently a large species, similar to *P. varifrons* or *P. episcopalis* var. *subtristis*.

EXPLANATION OF PLATES.

All figures are drawn to scale with the camera lucida. The face drawings are all enlarged the same amount, to show relative sizes, and proportions. Likewise the genitalia figures have all received equal magnification.

In comparing the facial figures account must be taken of the angle at which the head is placed, and the direction of the antennæ. In some the face is tipped slightly forward or backward, as shown by the eyes and antennal sockets; this tends to shorten the clypeus somewhat. Similarly the scape may be slanted upward, or even somewhat downward, and consequently changed a little in proportions; this can be distinguished by the apical margin, which is concave if high and convex if low. An apparent discrepancy is also noticeable in some cases where the broad surface of the scape is in view in one drawing and the narrow surface in another. In general, however, when the position is not normal the fact is evident from the figure, or attention is called to it in the text.

In the figures of genitalia the sagittæ often appear distorted, owing to their extreme delicacy as mentioned before, and apparent differences will be seen where none exist, so these cannot be relied upon. Similarly the stipites in some figures diverge noticeably, but this is merely due to the individual mount and not characteristic. Darkened areas in the eighth ventral plate vary considerably with the amount of clearing which the specimens have undergone, and are of no importance, except in such cases as are noted in the text.

Plate II.

11. *P. ziziæ*. Genital armature.
12. *P. modestus*. Genital armature.
13. *P. episcopalis*. Genital armature.
14. *P. fossata*. Genital armature.
15. *P. conspicua*. Genital armature.
16. *P. rudbeckiæ*. Genital armature
17. *P. varifrons*. Genital armature.
18. *P. tridentulus*. Genital armature.
19. *P. grossicornis*. Genital armature.
20. *P. calvus*. Genital armature.

21. *P. coloradensis*. Genital armature.
22. *P. nevadensis*. Genital armature.
23. *P. asininus*. Genital armature.
24. *P. wootoni*. Genital armature.

PLATE III.

25. *P. modestus*. Eighth ventral plate.
26. *P. ziziæ*. Eighth ventral plate.
27. *P. episcopalis*. Eighth ventral plate.
28. *P. fossata*. Eighth ventral plate.
29. *P. ziziæ*. Seventh ventral plate.
30. *P. ziziæ* var. *dunningi*. Seventh ventral plate.
31. *P. potens*. Seventh ventral plate.
32. *P. basalis*. Genital armature.
33. *P. potens*. Eighth ventral plate.
34. *P. basalis*. Eighth ventral plate.
35. *P. potens*. Genital armature.
36. *P. basalis*. Seventh ventral plate.

PLATE IV.

37. *P. rudbeckiæ*. Seventh ventral plate.
38. *P. cressoni*. Seventh ventral plate.
39. *P, cressoni*. form *saniculæ*. Seventh ventral plate.
40. *P. rudbeckiæ* var. *bakeri*. Seventh ventral plate.
41. *P. varifrons*. Seventh ventral plate.
42. *P. grossicornis*. Seventh ventral plate.
43. *P. tridentulus*. Seventh ventral plate.
44. *P. conspicua*. Seventh ventral plate.
45. *P. varifrons*. Eighth ventral plate.
46. *P. tridentulus*. Eighth ventral plate.
47. *P. tridentulus*. Eighth ventral plate (lateral view).
48. *P. grossicornis*. Eighth ventral plate.
49. *P. conspicua*. Eighth ventral plate.
50. *P. rudbeckiæ*. Eighth ventral plate.
51. *P. cressoni* form *saniculæ*. Eighth ventral plate.
52. *P. cressoni*. Eighth ventral plate.
53. *P. cressoni*. Eighth ventral plate.
54. *P. rudbeckiæ* var. *granulatus*. Eighth ventral plate.

PLATE V.

55. *P. asininus*. Seventh ventral plate.
56. *P. wootoni*. Seventh ventral plate.
57. *P. polifolii*. Seventh ventral plate.
58. *P. coloradensis*. Seventh ventral plate.
59. *P. calvus*. Seventh ventral plate.
60. *P. cookii*. Seventh ventral plate.

61. *P. nevadensis.* Seventh ventral plate.
62. *P. nevadensis.* Eighth ventral plate.
63. *P. calvus.* Eighth ventral plate.
64. *P. coloradensis.* Eighth ventral plate.
65. *P. polifolii.* Eighth ventral plate.
66. *P wootoni.* Eighth ventral plate.
67. *P. asininus.* Eighth ventral plate.
68. *P. cookii.* Eighth ventral plate.
69. *P. modestus.* Seventh ventral plate.
70. *P. modestus.* Seventh ventral plate.
71. *P. fossata.* Seventh ventral plate.
72. *P. modestus.* Seventh ventral plate.
73. *P. episcopalis.* Seventh ventral plate.
74. *P. episcopalis.* Seventh ventral plate.
75. *P. episcopalis* var. *coquillettii.* Seventh ventral plate.
76. *P. episcopalis.* Seventh ventral plate.

PLATE VI.

Face drawings of males.

77. *P. cressoni* var. *magniclavis* (paratype of *P. magniclavis*).
78. *P. cressoni.*
79. *P. cressoni.*
80. *P. cressoni* form *mesillæ.*
81. *P. cressoni.*
82. *P. cressoni.*
83. *P. cressoni* form *saniculæ.*
84. *P. grossicornis.*
85. *P. varifrons.*
86. *P. tridentulus.*
87. *P. grossicornis* (type).
88. *P. rudbeckiæ* var. *granulatus.*
89. *P. rudbeckiæ.*
90. *P. rudbeckiæ.*
91. *P. conspicua.*
92. *P. basalis.*

PLATE VII.

Face drawings of males.

93. *P. modestus.*
94. *P. modestus.*
95. *P. modestus.*
96. *P. modestus* var. *illinoiensis.*
97. *P. modestus.*
98. *P. modestus.*
99. *P. modestus.*
100. *P. modestus* var. *minyra.*
101. *P. ziziæ.*

102. *P. ziziæ* var. *dunningi.*
103. *P. episcopalis.*
104. *P. episcopalis* var. *coquillettii.*
105. *P. fossata.*
106. *P. potens.*

PLATE VIII.

Face drawings.
107. *P. coloradensis.* Male.
108. *P. megalotis.* Male
109. *P. asininus.* Male.
110. *P. calvus.* Male.
111. *P. cookii.* Male.
112. *P. wootoni.* Male.
113. *P. wootoni.* Male.
114. *P. polifolii.* Male.
115. *P. nevadensis.* Male.
116. *P. cookii.* Female.
117. *P. coloradensis,* Female.
118. *P. wootoni.* Female.
119. *P. megalotis.* Female (paratype).
120. *P. wootoni.* Female (type of *P. excavata*).
121. *P. nevadensis.* Female.
122. *P. polifolii.* Female.
123. *P. wootoni.* Female.

PLATE IX.

Face drawings, female.
124. *P. cressoni.*
125. *P. cressoni* form *mesillæ.*
126. *P. cressoni.*
127. *P. cressoni.*
128. *P. cressoni.*
129. *P. cressoni.*
130. *P. varifrons.*
131. *P. basalis.*
132. *P. episcopalis* var. *subtristis* (paratype of *P. subtristis*).
133. *P. fossata.*
134. *P. cressoni* var. *magniclavis* (paratype of *P. magniclavis*).
135. *P. conspicua.*
136. *P. modestus.*
137. *P. rudbeckiæ.*
138. *P. ziziæ.*
139. *P. episcopalis* var. *coquillettii.*